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DEC adds cluster to low end

Slowed response time called trade-off by some customers

By Ninamary Buba Maginnis

BOSTON — Digital Equipment Corp. last week announced software to provide a long-awaited clustering capability for its low-end Microvax II and Vaxstation II computers.

In a related development, DEC also announced volume software prices for Microvax II and Vaxstation II systems (see story page 10).

Clustering can give departmental users redundancy and reliability, according to DEC officials. Using Ethernet, the cluster systems can interconnect up to 13 Microvax II and Vaxstation II systems to a central Microvax or larger VAX computer functioning as a server. The server manages system software in a central file system so users can share resources such as disks, tapes and printers, DEC spokesmen said.

File sharing is accomplished at the record level to provide faster response time, according to Bill Segal, group manager of DEC's VAX Systems Software Group. But one Microvax II user who eyed low-end clustering at a DEC-sponsored users meeting voiced concern about a slow response time. "Most people thought it would be slow because of Ethernet," said Deb Schemenauer, data processing manager for Atlas Steel Rule Die, Inc. in Elkhart, Ind.

Beta-test user Richard Duncan reported about a 20% slower response time over stand-alone systems but said that was not a major problem. "It's not like it's

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TOP OF THE NEWS

Acquisitions by MSA and others last week signaled consolidation in the software industry. **Page 126.**

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Micro managers ponder the value of attending Comdex this week. **Page 4.**

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Office automation net protocols claim Hewlett-Packard as the latest disciple. **Page 6.**

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MIS budgets for 1987 pegged at new low in recent survey. **Page 73.**

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Bending to the whims of a major user, Lotus will ship an unprotected version of 1-2-3 to Uncle Sam. **Page 13.**

■

According to sources close to both firms, Ronald S. Posner, who recently resigned as executive vice-president of Ashton-Tate, will likely join Ansa Software as president. Barring a last-minute breakdown, the announcement of

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Gap looms for older Ethernets

By Elisabeth Horwitt

Some users may find out the hard way that Ethernet and the Ethernet-like version of the Open Systems Interconnect standard are not one and the same.

As the industry continues its slow, uneven progress toward full OSI implementation, companies with extensive networks based on older Ethernet protocols face a dilemma. They can delay their own conversion to OSI until the entire industry supports all seven layers of the standard — a development that is still some years away, according to analysts — or they can gradually add OSI-compatible interfaces to their networks, with the understanding that these devices may not be able to communicate with products that conform to the older Ethernet Version 1 protocols.

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Merger fallout puts Memorex across Atlantic

By Alan Alper

DETROIT — Burroughs Corp. agreed last week to sell major portions of its Memorex Corp. subsidiary to a Memorex management group and a New York investor in a cash and stock deal valued at approximately $550 million.

As expected, Burroughs will continue to manufacture large-scale disk drives for its own systems [CW, Oct. 27], for those of recently acquired Sperry Corp. and for the new Memorex, which will sell those products to the IBM plug-compatible mainframe market.

Memorex plug-compatible peripherals customers said last week they did not expect any changes in their business relationship with the new London-based firm.

"I didn't see any changes in my relationship with Memorex when Burroughs bought them in 1981, and I don't expect any now," noted Anthony Fiumefreddo, vice-president of data services for Erisco, Inc., a data processing company in New York. "Hell, IBM reorganizes all the time. I always have a different salesman from a different division coming to call on me, and that doesn't change anything."

Fiumefreddo, who has one string of 3380-compatible drives and "a lot" of Memorex terminal equipment, said he will continue to work with Memorex as long as the firm responds quickly to IBM products. "But as soon as I have a problem, I'll just call another vendor," he added.

Analysts held a similar view. "I don't think Memorex's customers will have much to worry about as long as Burroughs is able to promptly respond to new IBM disk products," noted James Porter, a disk drive industry analyst. "If Burroughs doesn't, however, that could set off a mad scramble for products and will be hard for

See **MERGER** page 8

CW SPECIAL REPORT

Bright lights: Early users of optical disks

By Donna Raimondi

Optical storage is beginning to find its way into data centers, even though standards and erasability elude the rapidly growing industry that hopes to supplant magnetic storage.

One user who has adopted optical technology is Rod Myers, first vice-president with Security Pacific Automation Co., the data processing arm of Security Pacific National Bank. He says optical storage subsystems are particularly good at addressing the needs of paper-intensive environments, such as researching worldwide money transfer transactions.

Myers has had one Filenet Corp. subsystem up and running for more than a year and is installing another. Neither of the systems will be connected to the mainframe, but each automates a business function as completely as computers automated financial functions years ago, he says (see story page 14).

Filenet, perhaps the best known of the optical subsystem companies, says that only 25% of its 50 installed subsystems are used for archival storage; the remaining 75% are used to manage work flow. "Work flow in most heavy paper environments is still managed like pre-Henry Ford assembly lines," says David Siegle, vice-president of marketing at Filenet. Optical systems allow companies with thousands of documents streaming in each day, such as banks and insurance

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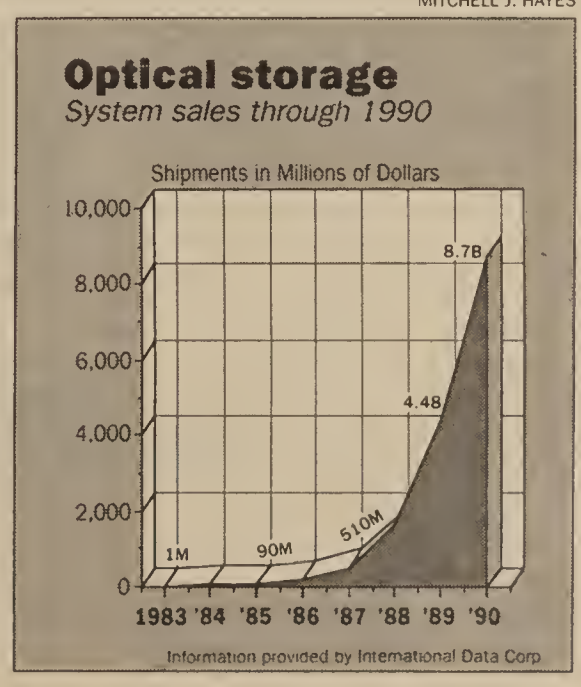

NEWSPAPER

IBM reworks on-site testing program, broadens market

By Clinton Wilder

IBM has recently revamped its on-site testing allowance program with several changes that could make the option available to more customers.

The program allows qualified buyers in IBM's large accounts free use of a 3090 or 4381 series mainframe for a period of up to 90 days, providing the system is used for software installation and testing only and not in actual day-to-day data processing operations. Although an IBM spokesman said that the changes are generally of a clarifying or simplifying nature, they could serve to expand the availability of the on-site testing allowance option.

Ambrose A. Carr Jr., director of industry relations for IBM's Information Systems Group, recently told members of the Computer Dealers and Lessors Association (CDLA) that the changes, as a whole, may broaden the program.

Changing guideline for CPU use

The changes include altering the "no productive use" guideline to allow customers to use their CPUs for "productive use for limited pilot and stress testing," the spokesman said.

Qualification guidelines and criteria for the duration of an on-site testing allowance have not been changed but will be released to sales representatives for the first time. The decision to approve such an allowance in a sales contract still rests with IBM's headquarters marketing unit, however.

The guidelines essentially require the customer to be installing an entirely new CPU system, rather than adding on to an existing one. The on-site testing allowance agreement may include new peripherals purchased with the new CPU, but the allowance is not available in contracts exclusively for peripherals.

Consistency in offerings

Carr reportedly told CDLA members that IBM is seeking more consistency in the way the program is offered in the marketplace, an effort that leasing firms applauded. Lessors that compete with IBM have suggested that IBM branch-level sales efforts sometimes bend IBM's own rules in order to make a sale.

"Every customer in the Fortune 1,000 is highly aware of the program's rules," said Tom Martin, president of lessor Computer Financial in Hackensack, N.J. "Most customers are honest and adhere to that, but some don't, and IBM sometimes seems to look the other way."

"We know we're playing in an IBM game," said Robert Gulko, newly elected CDLA chairman and president of Unicom Computer Corp. in Sausalito, Calif. "We just like the rules to be consistent."

The testing allowance has been available in various forms to IBM customers since 1963, and the spokesman stressed that criteria for the on-site testing allowance will continue to be "subject to periodic review and change."

VAX board theft trial nears

By Ninamary Buba Maginnis

COLUMBUS, Ohio — A Columbus man will be arraigned here Nov. 14 and answer to a 15-count federal grand jury indictment in connection with a rash of nationwide Digital Equipment Corp. circuit board thefts.

Philip James Smith, 25, is charged with 15 counts of interstate transportation of stolen property valued in excess of $5,000, according to David Cassens of the Federal Bureau of Investigation's Columbus office.

The ongoing investigation links Smith to 12 Columbus-area DEC VAX board thefts — possibly more — and he may be charged with possession of stolen property at the state level, according to Columbus police Detective Robert Snyder.

Stolen components to wholesalers

The federal indictment charges that Smith transported stolen computer components to two computer wholesalers — Danvers, Mass.-based Meadowlark Enterprises, Inc. and Pittsford, N.Y.-based Applied Digital Systems — on 15 occasions, from November 1985 until last September, according to Assistant U.S. Attorney Dale Williams [CW, Sept. 29].

The firms to whom Smith was selling the printed-circuit boards should not have been able to purchase them from any source except an authorized DEC distributer, Snyder said.

Authorities said the case is still under investigation and that additional people may be charged.

Arrested at home

Smith was arrested in his home Sept. 30 on charges of shipping across state lines $400,000 worth of DEC VAX printed-circuit boards stolen from Ohio State University's College of Engineering on Sept. 17.

Since then, Smith has been linked to various VAX thefts, including the March 27-28 Westerville, Ohio, theft at Schlumberger Well Service, where $200,000 worth of VAX-11/780 printed-circuit boards were stolen, according to Westerville detective Sgt. James Whitney.

Smith is also implicated in a $70,000 VAX theft at Alpha II Systems in Whitehall, Ohio, that occurred just two months after Smith terminated employment there, according to Columbus's Snyder.

Used eight aliases

The FBI says Smith operated three computer companies and used eight aliases.

Smith is being held in lieu of bond and, if convicted on all counts, could face up to 150 years in prison and $3.75 million in fines, the FBI's Cassens said.

Possession of stolen property in Ohio is a third-degree felony punishable by a maximum sentence of 10 years and/or a $5,000 fine.

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PAGE 17 ILLUSTRATIONS BY ALAN WITSCHONKE

THE 4TH GENERATION GAP JUST GOT WIDER.

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Users to explore 80386 potential at Comdex

Superchip market said to be at 'turning point'

By David Bright

LAS VEGAS — Micro managers are eagerly awaiting the debut of products based on Intel Corp.'s 80386 at this week's Comdex/Fall '86.

Viewing for the first time an array of products based on the much-talked-about chip, managers contacted last week were eager to satisfy their curiosity and get a better idea of where the products might fit into their corporate strategies.

Sandra Sparks, an office technology specialist with Lawrence Livermore National Laboratory in Livermore, Calif., is attending the show to investigate the emerging 80386 technology as well as desktop publishing systems and the connectivity issue. The 32-bit 80386's power may be needed to properly support desktop publishing packages designed for the IBM Personal Computer, she notes.

Another manager says that he wanted to visit the show for the sole purpose of putting the 80386 market into perspective. Because of the uncertainty surrounding future 80386-based operating systems, applications software, peripherals and IBM's 80386 intentions, the market is at "a critical turning point," says Fred Zickert, personal computer manager at Eaton Corp. in Cleveland.

But despite all the microcomputer-related activity at Comdex/Fall, some managers say they are bypassing the show because they will get the pertinent information soon enough. "There's no advantage in going," says Bill Sutliff, a program manager involved in technology procurement at General Electric Co. in Bridgeport, Conn. A cross-country trip is simply not warranted, Sutliff says.

A host of vendors, including Convergent Technologies, Inc. (see story below), will introduce 80386-based systems, boards and software [CW, Nov. 3]. But many of the approximately 1,200 vendors sprawled across six locations at the show will announce other microcomputer products worthy of note.

AST Research, Inc. will introduce upgrades to several of its products and a new PC expansion card for video applications. Its Turbo Laser Plus is said to produce 15 original pages per minute. AST will also announce a series of hard disk subsystems for the IBM PC available in 120M-byte, 240M-byte or 320M-byte configurations, expandable to 2.24G bytes.

Proteon, Inc. is adding to its Pronet-4 family of token-ring local-area networks. Included in the offerings will be an intelligent Intel Multibus board supporting Transmission Control Protocol/Internet Protocol and other industry-standard communications protocols and a nonintelligent Multibus board for systems running networking protocols such as Unix in the host system.

In one of the first multiuser implementations of the 80386 microprocessor, Integrated Business Computers (IBC) will announce a system built to support up to 100 users. Called the Ensign 386:100, the system runs a customized version of Theos Software Corp.'s operating system, which was formerly know as Oasis. In the near future, IBC will offer Microsoft Corp.'s MS-DOS options for the machine, according to IBC President Randy Rodgers, and will support Microsoft's Xenix System V/386 when that becomes available. Prices range from $7,995 for a 16-port version to more than $70,000 for a machine with 100 ports.

On the software side, Oracle Corp. will officially announce the Easy SQL package that it has been demonstrating for the past few months. The package is intended to enable novice IBM PC and Digital Equipment Corp. VAX users to interface to the Oracle relational DBMS. The price for adding Easy SQL to Oracle at the PC level will be about $200 or $300, according to an Oracle spokeswoman.

Claiming a low price advantage, Link Technologies, Inc. plans to announce a terminal that functions as both a multiuser PC terminal and as an ASCII terminal. The $419 MC-1 unit comes with an IBM Personal Computer AT-style keyboard, the full IBM PC character set and two communications ports.

For network applications, Asher Technologies, Inc. will introduce an Intel 80286-based file server that can be expanded from 109M bytes to 732M bytes of capacity. According to Asher officials, the file server's processor yields nearly twice the performance of an IBM PC AT in network applications. Prices for the server range from $15,000 to $38,830.

Ideassociates, Inc. will announce enhancements and additions to its PC-to-IBM Systems/34, 36 and 38 and PC-to-IBM mainframe product lines.

Correspondent Peggy Watt contributed to this report.

Convergent joins 32-bit rollout, upgrades net lineup

By Peggy Watt

SAN JOSE, Calif. — Convergent Technologies, Inc. this week is scheduled to announce an Intel Corp. 80386-based addition to its Ngen family of workstations along with several network components, including a telephone-wiring-based network connection.

The Series 386 Ngen Central Processor Module, like the rest of the Ngen line, is primarily an OEM product, but Convergent spokesmen said the manufacturer may market the system itself in some configurations.

Also to be announced is the Network PC, a small, IBM Personal Computer AT-compatible unit. It can be configured with a disk drive but is intended for network use, and the user can eventually upgrade to an 80386-based system, the company said.

The Telecluster local-area networking (LAN) system enables workstations to be linked through existing telephone wiring for 2-MHz communications using Convergent's Clustershare software and Clustercard.

The 386 Ngen system is scheduled to begin shipping in December, with the other products available early in 1987, according to Jeffrey Tisza, product marketing manager of the Cluster Systems Division.

The 80386 system uses Convergent's CTOS operating system to access 4M bytes of physical memory in CTOS, Tisza said. It can run as many as 10 applications or operating systems concurrently, Tisza said, and runs both Microsoft Corp. MS-DOS and AT&T Unix System V. Convergent will implement a DOS-under-Unix system for the 386 Ngen.

The Series 386 Ngen workstation will carry a suggested retail price of just under $5,000, configured with 1M byte of memory. The 8-MHz, Intel 80286-based Network PC, a 15- by 15-in. box, will have a suggested price of $1,995. The Network PC can be joined to a Convergent Ngen work group through Clustershare software and with the addition of a Clustercard.

Convergent is also offering a LAN wiring option to link up to 24 workstations over existing twisted-pair telephone connections with its Telecluster, which will be available first-quarter 1987, Stone said.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

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Maintenance fee hikes hit Cullinet users

By Charles Babcock

WESTWOOD, Mass. — Cullinet Software, Inc. confirmed last week that it is increasing its annual maintenance fees on applications from 10% to 15% and the fee on its data base management system from 10% to 13%.

Cullinet said an increase in support services would accompany the fee increase.

"We will increase our services to the level that our customers said they expect. The increased revenue levels will pretty much match the increase in our cost of services," said Michael Greeley, Cullinet spokesman.

The fee increase comes a few days before Cullinet is due to report its second-quarter results, which may reflect its second loss as a public company. Cullinet reported a $10.6 million loss at the end of the first quarter of fiscal 1987, its first since going public in 1978. It is due to report its second-quarter results Nov. 17, and Wall Street analysts expect it to be a break-even or another losing quarter.

> ***'The increased revenue levels will pretty much match the increase in our cost of services.'***
>
> — Michael Greeley
> Cullinet Software, Inc.

Michael Geran, research analyst at The E. F. Hutton Group, Inc. in New York, said the fee increases "are not enough of a change to make a big impact" on Cullinet's revenue. Slow IBM mainframe sales and a slowdown in the data base management system market is believed to be hurting Cullinet's ability to raise revenue this year.

Cullinet spokesmen said the applications software is bearing a larger fee increase because applications require more modifications in source code and installation support. Greeley said the increases bring Cullinet's fees more in line with industry averages. Spokesmen for two other mainframe software companies said the annual maintenance or renewal fees typically run from 12% to 15% or 12% to 17%.

A Cullinet customer who requested anonymity said the increases represent a 30% to 50% jump in maintenance fees. The maintenance fee on a $70,000 application would go up $3,500 to $10,500, said a spokesman for a company that uses several Cullinet manufacturing applications and its IDMS/R data base management system.

"It has to be tied into the whole financial situation of the company," he said.

"Customers will always complain," Geran said, adding that they are willing to pay the higher fee for a solid product line.

Gap looms for older Ethernets

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On the physical level, which determines how packets gain access to the network medium, the old Ethernet is close enough to the OSI 802.3 standard, vendors say. But as one gets into higher realms of data packet framing, routing and networking software protocols, incompatibilities between users' current networking protocols and the emerging standard become more and more difficult to reconcile.

GTE Corp., which uses Ethernet Version 1 to network a wide range of systems and vendors, faces just such a dilemma. "If we decide we need computer or peripheral devices that support OSI interfaces, we'll be in trouble," says Steven Leiden, a senior member of GTE's technical staff. The company's biggest fear is of being forced to perform a wholesale OSI conversion of its installed base, which includes hundreds of workstations, mainframes and minicomputers.

"The biggest problem is internetworking between different vendors," notes Mark Calkins, a product manager at network vendor Ungermann-Bass, Inc. "Customers are not beating up on us for not having OSI yet; they worry about how to communicate when they have both OSI and Ethernet on the same network."

Networking vendors interviewed by *Computerworld* agree that full migration to OSI is still a long way off. "Most carrier-sense multiple access with collision detection local-area networks (LAN) will be based on the older Ethernet protocols for the next few years," says Rod Hodgeman, LAN marketing manager for Digital Equipment Corp.'s networks and communications group.

Currently available networking hardware from DEC complies with the lower level protocols of both Ethernet Version 1 and OSI. The next version of DEC's VAX operating system, VMS, to be released at an unspecified time, will also support both protocols, according to Hodgeman. DEC, meanwhile, provides VAX OSI Transport Service, a software package announced last February that enables VAXs to communicate using either protocol, Hodgeman says.

A number of independent network vendors, such as Bridge Communications, Inc. and Ungermann-Bass, see their role as supporting old and new networking protocols in whatever combination the user chooses. The two vendors' Ethernet boards come in two versions, 802.3 and Ethernet Version 1, each running different — and incompatible — data link packet framing protocols.

Widely used networking protocols

On top of that, users can choose between Transmission Control Protocol/Internet Protocol (TCP/IP) and Xerox Corp.'s Xerox Networking Services (XNS), two sets of networking protocols that are widely used in multivendor installations. The network vendors also promise to make OSI high-level protocols available as they are finalized.

Internetwork bridges, which are scheduled to be introduced next week by Ungermann-Bass, handle transmissions according to either 802.3 or Ethernet Version 1 specifications as well as a wide variety of high-level protocols.

But while the above products enable different types of networking devices to coexist on the same cable, communication only occurs between systems using like protocols, according to Judith Estrin, Bridge's vice-president of research and development.

This limitation is of no consequence when there are two user communities that never need to communicate. But it poses a problem when a firm like GTE decides to install OSI-compatible devices that need to communicate with an existing base of Ethernet Version 1 network interfaces, GTE's Leiden says.

GTE currently networks several hundred DEC VT200 terminals, Apple Computer, Inc. Macintoshes and IBM Personal Computers as well as DEC hosts, with Bridge servers supporting the old Ethernet Version 1 data link protocols. "Eventually all the vendors will go the OSI way, but right now it's too expensive to make the conversion," Leiden says. He says he hopes that by the time his company is ready to move to OSI, the existing Bridge servers will be ready for replacement anyway.

Both Bridge and Ungermann-Bass incorporate network protocols in software, which makes upgrading from Ethernet to OSI on the physical and data link levels "a simple matter of loading in a new floppy disk," according to Leiden.

But once users have successfully upgraded to the OSI standard on the data link layer, they have to face "the far more interesting turf" of migrating their existing networking software — and all of the applications written for it — to OSI, DEC's Hodgeman points out.

Converting to OSI from either TCP/IP or XNS promises a lot of headaches to corporations with extensive networks, Hodgeman notes. "Moving from TCP/IP to OSI may be simple for network vendors like Bridge and Ungermann-Bass," but not for a firm whose employees have been using TCP/IP-compatible electronic mail, file transfer and terminal emulation software, he says.

DEC claims it will migrate to OSI, "using the same interfaces as Decnet and taking our user base with us," Hodgeman says. But this does not address the needs of user firms such as GTE that are using a wide range of networking protocols and vendors aside from DEC.

GTE currently uses TCP/IP protocols to link Sun Microsystems, Inc. and Apollo Computer, Inc. computer-aided design workstations; Decnet for DEC systems; and XNS for the other systems. A combination of internally developed and third-party software programs tie together incompatible systems, such as IBM hosts, Decsystem-20s and asynchronous workstations. "At the moment, our system works and is user-neutral if not user-friendly," Leiden says.

Rollouts tie HP PCs to office systems nets

By Jeffry Beeler

CUPERTINO, Calif. — Hewlett-Packard Co. today will follow other office automation vendors in introducing networking products that use industry-standard protocols between its personal computers and larger classes of processors.

The company will unveil HP Star LAN, which extends the 802.3 standard to IBM-compatible PCs and allows them to communicate with HP 3000s via twisted-pair wiring.

Also highlighting this week's Comdex/Fall '86-related announcements are HP Office Connect-to-Disoss and HP LU6.2. Together, these products will allow HP PCs to exchange electronic mail with other systems on an IBM Distributed Office Support System (Disoss) network, using an HP 3000 as an intermediary. HP LU6.2 allows HP 3000s to communicate with IBM mainframes on a peer-to-peer basis.

Another addition to the company's networking product line is HP SNA Link/3270, which enables Vectras and HP Portable Pluses to communicate directly with IBM mainframes, according to Bernard Guidon, marketing manager for HP's Information Networks Group.

Other debuts

Rounding out the Nov. 10 announcements are the following:

- HP Serial Network, a software package that permits users who occasionally need to communicate asynchronously with distant PCs or 3000s to do so through RS-232 interfaces.
- HP Site Wire, a support program to design and implement custom wiring guidelines.

Each of the elements in this week's HP networking enhancement is "part of the typical office system user's RFP [request for proposal] checklist," according to Terence Bentley, director of data communications research at Boston-based The Yankee Group, Inc. "If a vendor doesn't provide every required item on the standard list, its prospects will go elsewhere for their solutions."

A similar point of view was expressed by John McCarthy, research manager at Forrester Research, Inc. "HP is trying to prove that it's a top-flight vendor in the same class with IBM and DEC," McCarthy said. "HP hopes to get on its users' short lists and remove any communications impediments to the sale of its 3000s."

Previously, HP supported the 802.3 standard only for its three largest families of processors — the 3000, 9000 and 1000. But with Star LAN, the company is making the protocol available to its PCs.

HP's Office Connect-to-Disoss and HP LU6.2 reside in a 3000 series server. Office Connect-to-Disoss, which reportedly supports IBM's Document Content Architecture/Document Interchange Architecture standard, is priced from $1,400 to $3,500; HP SNA Link/3270 is $1,000; and HP LU6.2 costs from $3,200 to $8,000. HP Star LAN user and server kits cost $595 to $1,095, and HP Serial Network sells for $295 to $550.

LAN version of Dbase said to be Token-Ring compatible

Users see little impact in intro — for now

By Douglas Barney

TORRANCE, Calif. — Ashton-Tate last week announced that Dbase III Plus LAN Pack 1.1, a local-area network (LAN) version of its data base software, is fully compatible with the IBM Token-Ring LAN.

Dbase users have been slow to adopt the IBM Token-Ring net and viewed the Ashton-Tate announcement as having little present impact.

"Right now, we are running on Novell, Inc.'s [Advanced Netware], and we are pretty happy with that. We won't be using the IBM Token-Ring for quite a while," said Bob Merkel, systems engineer for Professional Automation Systems, a division of Professional Control Corp., a Germantown, Wis.-based sales distribution automation firm.

Another large Dbase user agreed but viewed the announcement as having an impact in the future. "At the moment, we do not have a lot of Token-Ring stuff running, but clearly that is a quasi-standard that everybody is latching onto. As we see more of our tax return preparation vendors going toward Token-Ring implementation of their software, that becomes a requirement," said G. Jeffrey Knepper, director of advanced technology tax, for Touche Ross & Co. in Washington, D.C.

"We will probably shift to Token-Ring as a standard at some point in time," Knepper said. He added that Touche Ross is currently running Dbase III Plus LAN Pack on 3Com Corp. LAN cards using a Banyan Systems, Inc. file server.

Although Ashton-Tate had not previously certified Dbase to run on the IBM Token-Ring net, it said that no changes were made to Dbase to achieve compatibility. Dbase LAN Pack is only certified to run on the Token-Ring when IBM Personal Computer Local-Area Network Program Version 1.12 is used. "That is the version we certified with," said Robert Kimball, product manager of Dbase products for Ashton-Tate.

Although there is currently little demand for Token-Ring-compatible software, an expected growth in Token-Ring installations should give the Ashton-Tate announcement significance. "It is a strategic offering," Kimball noted.

With the promise from IBM of Token-Ring connections to larger systems to be available next year, Token-Ring installations should grow beyond the current small number, according to Clare Fleig, director of systems research for International Technology Group, a Los Altos, Calif.-based research consulting firm.

TOP OF THE NEWS

NEWS from page 1

Posner's move to the Ashton-Tate competitor is expected today.

■

The American Farm Bureau Federation last week contracted AT&T to establish a nationwide satellite communication system. AT&T's Skynet Star Network Service is currently being evaluated by the national farm organization as a method for transmitting data and video mesages among Farm Bureau offices around the country. Federation President Dean Kleckner said that, after satisfactory completion of a test program, as many as 1,500 state and county offices would be linked via the satellite network.

■

Comdisco, Inc., the leading independent computer leasing firm, kept rolling along in financial results announced last week. Comdisco reported fiscal 1986 revenue of $901.8 million, a 50% gain over year-earlier figures. Profits from operations for the year were up 37% to $78.8 million, or $1.91 per share. Fourth-quarter profits and revenue were up 28% and 39%, respectively.

■

The Boston Computer Exchange will announce next week its plans for an electronic "stock exchange" to provide a mechanism for the buying and selling of used computers. The system will use an on-line ticker with real-time bidding as well as asking and closing prices.

■

U.S. Sprint's Telenet Communications Corp. recently completed the merger of Telenet and Uninet packet-switching networks into a single Telenet Public Data Network. In migrating to the new network, Uninet customers were not required to change their equipment or lease additional lines.

■

Austin, Texas, mail order house PC's Limited will preview a 16-MHz Intel 80386-based system and introduce a 16-MHz 80286-based AT-compatible system at this week's Comdex. The 80386 system should be priced at approximately $4,500 — about $2,000 less than Compaq Computer's Deskpro 386. Without a hard disk, the 80286-based machine will be priced at $2,995.

Autofact '86 crowds to view PC-based CAD/CAM lineup

By Elisabeth Horwitt and Rosemary Hamilton

The Autofact conference this week in Detroit is likely to be a much quieter event than Autofact '85, where vendors trumpeted their support of communications standards.

Last year, the Manufacturing Automation Protocol/Technical Office Protocol (MAP/TOP) demonstration drew huge crowds, but this year, personal computer-based computer-aided design and manufacturing (CAD/CAM) products will dominate.

Analysts disagreed about whether Autofact reflects a continuing ill health or a turn for the better in the CAD/CAM industry. "On the domestic side, CAD/CAM is not hot, technology in general is not hot, yet Detroit is more sold out this year than at any other Autofact," said Laura Conigliaro, a vice-president at Prudential-Bache Securities, Inc. who follows the computer-integrated manufacturing (CIM) arena.

In contrast, Bruce Jenkins, a senior analyst at the Cambridge, Mass., CAD/CAM market research firm Daratech, Inc., predicted Autofact would supply proof that the whole CAD/CAM industry is "downsizing, being forced to live with a lower revenue stream." Daratech has estimated this year's CAD/CAM market growth at 17%, as opposed to 25% last year, and expects only a 14.2% growth next year.

On the plus side, the rate of CAD/CAM workstations shipped is a healthy 10,000 units per month, with the vast majority of those systems based on PCs, Jenkins said.

Among the product announcements scheduled for Autofact are the following:

• The Computer Systems Division of Harris Corp. will introduce a computer server based on a proprietary microprocessor and two engineering workstations that are based on the Motorola, Inc. 68020 chip. The hardware can be linked on an Ethernet network running Sun Microsystems, Inc. Network File System software. The computer server starts at $285,200 and will be available in January 1987. The entry-level HS-240 workstation starts at $49,900, while the high-end HS-260 starts at $84,900. Both are currently available.

• Cognition, Inc., which demonstrated a CAD system based on a modified IBM Personal Computer AT last year, will demonstrate the same system on a Digital Equipment Corp. Vaxstation/GPX this year.

• Aries Technology, Inc. will introduce its PC AT-based Concept station, designed to compete with Cognition's product.

• NEC Information Systems, Inc. will enter the engineering workstation market with a product based on the 68020 chip.

• Boeing Computer Services Co. will expand its line of CAD/CAM software products designed primarily for IBM, DEC and Apollo Computer, Inc. systems.

• Evans & Sutherland, Inc. and Apollo will jointly unveil Romulus D, a solid modeling-based mechanical computer-aided engineering software package that will run on Apollo's DM 560, 570 and 580 workstation lines.

Computervision Corp. is exhibiting for the first time its complete Cadds software line on its Caddstation hardware, which is based on a Sun workstation.

Its rival, Integraph Corp., is making a similar push with the Interact and Interpro 32C workstations. The company also plans to exhibit a new object-oriented data base, which combines both graphical representations and associated text data into one data base.

Apollo, meanwhile, will expand its workstation-to-mainframe communications product line with a "non-MAP-oriented CIM product," a company spokesman said.

Jenkins predicted that other vendors would be announcing gateways between different computing environments, such as engineering and MIS.

DEC is one of the few vendors planning to unveil a MAP product at Autofact, but the firm declined to elaborate on the type of product.

Merger pushes Memorex overseas

From page 1

Memorex to fill."

The group of Memorex executives, led by Giorgio Ronchi, vice-president in southern Europe and Latin America, have teamed up with New York investor Eli Jacobs to purchase Memorex operations. They will acquire the company's PCM sales and service operation, its communications engineering and manufacturing organization — which makes IBM 3270 plug-compatible peripherals — and its media products businesses. The acquisition is expected to be concluded by year's end.

The divestiture fits with Chairman W. Michael Blumenthal's plan to reduce by about $1.5 billion the debt taken on to finance the $4.8 million purchase of Sperry this year. Previously, Burroughs said it plans to sell Sperry's Aerospace & Marine group. In another development, the name of the merged company is expected to be announced today.

Following a strategic review of the combined entity, company officals decided to focus on two core businesses — commercial computers and the defense business.

"Sales to IBM PCM customers were not considered a core business and therefore were no longer required," said Philip Dauber, Memorex president and a Burroughs senior vice-president, in an interview last week. "What was needed was disk-drive manufacturing and the technology."

Memorex will continue its arrangement with its IBM 3270-compatible peripherals suppliers and its agreement to purchase PCM tape drives from Fujitsu Ltd., Dauber said.

Sperry, which purchases large-scale disk drives from Hitachi Ltd. for its systems sold in Japan, will continue that relationship, Dauber noted. Sperry's participation in Magnetic Peripherals, Inc., a Control Data Corp. majority-owned disk drive firm, is being re-evaluated in light of the Memorex divestiture, Dauber said.

Ronchi, who will be chief executive of the new Memorex, said Drexel Burnham Lambert, Inc. in New York is helping to raise the capital required. Burroughs will own some preferred stock in the new Memorex but will not have a say in how the company is operated, Ronchi added.

Memorex, with revenue of about $900 million and employing 6,000 workers, is expected to be headquartered in London and will do business under the Memorex name.

The London headquarters, Ronchi said, reflects the fact that two-thirds of the firm's business is in Europe.

Despite persistent reports that Memorex was considering a withdrawal from the IBM 3270-compatible peripherals market, Ronchi said, "That business segment is our most profitable and fastest growing area."

Memorex's position in the 3380-compatible market had been hurt by manufacturing problems, which have been corrected but which plagued the firm through most of 1985. According to Porter, Memorex held a 9.1% share of the $689 million worldwide PCM disk market in 1985. Fujitsu and Hitachi each held 33% of the market that year, Porter estimated.

"Memorex has not lost any market share this year because they fixed the well-documented problems with their 3380-compatible products," Porter said.

Sources close to the situation last week said that Memorex has the option to purchase IBM PCM disk drives from other vendors if Burroughs is unable to supply them. "Memorex's obligation to purchase Burroughs drives is based on Burroughs' performance," one source noted.

The design and manufacture of large-scale disk drives for Burroughs and Sperry systems is being consolidated in an engineering and manufacturing operation located at Memorex's current headquarters in Santa Clara, Calif. The Peripherals Products Group, as it is called, will also design interfaces for Sperry systems, Dauber said.

Dauber, who became president of Memorex in June 1984, will remain with Burroughs. He will be co-president of the Burroughs Systems Products group with Hollis Caswell. That group is responsible for all manufacturing of Sperry and Burroughs products and includes the Peripherals Group, Dauber noted.

Burroughs acquired Memorex in December 1981 for approximately $100 million and the assumption of $200 million in debt.

Solutionpacs service highlights IBM integration strategy

By Charles Babcock

PHOENIX — IBM will offer coordinated services when it sells selected software packages, termed Solutionpacs, functioning more as a systems integrator than it has in the past, a top-level IBM official said last week.

Robert Berland, IBM's director of strategic planning, addressed members of the independent software vendor's association ADAPSO during its conference in Phoenix. He faced questioning from attendees on whether the Solutionpac approach represented a return to a form of bundling software with hardware — a practice IBM abandoned in 1969. Berland said IBM users would choose whether they bought only software or software tied to services and hardware.

He said IBM is offering eight Solutionpacs, five of them aimed at specific industry groups, and claimed IBM's entry into application areas stimulates the market for everybody.

One package, Integrated Banking Applications, is the offshoot of IBM's deal with Dallas-based Hogan Systems, Inc. in which IBM acquired the right to market Hogan's product line for 20 years.

"I understand when we go into an area it makes some people nervous. I submit, however, that the best thing that ever happens is competition," Berland told the group.

Integrated Banking Applications will offer eight integrated applications, an interface module and installation help. In addition, the applications can be customized with services from IBM.

Other industry-specific Solutionpac offerings are as follows:

• Plant Automation and Materials Tracking, a factory automation package that customizes factory floor applications.

• Store Implementation, to provide retail customers with store installation and support services for IBM's retail applications.

• Education Computing Support System, a software package from McGill University that provides interactive computer systems for small colleges.

• Branch Banking Automation, designed to provide installation and support services to bank branches using the IBM 4700 banking terminal and related software.

Three cross-industry packages also feature software and service:

• Local Area Network and Implementation Services, to help IBM customers design and install Token-Ring and PC Network local networks.

• Software Engineering, an integrated set of software development tools to manage the development process.

• Expert Systems, a shell system aimed at helping the first-time developer of a knowledge base get started.

A representative of an independent vendor raised the possibility that IBM would cooperate with one software vendor and exclude other vendors in a vertical market. Berland responded, "Where is there any evidence in any area where [IBM's entry] really has been a deterrent [to other companies]?"

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DEC adds cluster to its low end

From page 1

totally bogus — or totally slow," said Duncan, who is manager of artificial intelligence systems engineering for Crosfield Composition Systems, Inc. in Elmsford, N.Y.

"Whatever the percentage, it's inconsequential when compared to the amount of flexibility we're getting," Duncan added. He said the company used eight Vaxstation IIs and two Microvax II computers clustered with a VAX 11/785 server system. "One of the biggest complaints of Vaxstations is not being able to put a big disk on," Duncan said. "With clustering, that problem just goes away." Clustering allows all users to share cluster resources and access all files transparently from any node on the cluster, according to Duncan, whose company develops applications for newspaper publishing on DEC hardware.

A product development group at the CAE Systems Division of Tektronix, Inc., another beta-test site, operated a cluster of eight Vaxstations with a VAX 750 server system. Before clustering technology, engineers could not compile and link programs on Vaxstation II computers, according to Charles Way, a beta user at CAE Systems, Inc. in Burlington, Mass.

"We didn't have the disk space for it on the Vaxstation IIs," Way noted. "It's a strategic problem." Clustering allows programmers to perform disk-intensive tasks on the larger VAX from Vaxstation II systems without the need to transfer files, Way said.

"We load our systems pretty heavily," he said. "We didn't notice any slowdown in response time. We're doing local edits on the Vaxstation II that's twice as fast as the 750. It's dedicated and faster. We're able to work on the Vaxstation II CPU rather than the 750, but we can use the larger disk space in the 750."

No additional hardware is required to use the clustering software, DEC officials said. "We are, I guess you could say today, a software company," DEC President Kenneth H. Olsen said. "We design our hardware, networks and computers to run software on. It's quite different from the early days of computers."

While the initial release only supports up to 13 Microvax II or Vaxmate II systems, future releases will include support of more computers, the vendor said. The first release supports only DEC's priority VMS operating system, but future releases will support Ultrix software, DEC's version of the Unix operating system, according to the vendor.

Local-area Vaxcluster system software costs $1,000 for Vaxstation IIs, $1,900 for Microvax IIs and up to $9,500 for the VAX 8800. The software will be available in December.

DEC offers volume discounts to low-end software users

By Ninamary Buba Maginnis

BOSTON — Departing from earlier software pricing policy, Digital Equipment Corp. last week said it will offer volume discounts up to almost 40% for users of its Microvax II and Vaxstation II systems.

"Why didn't we do it earlier? It was just an oversight," DEC President Kenneth H. Olsen stated.

Although IBM recently lowered software costs for some hardware, "I don't think this is a direct response to IBM," said Carl Gallozzi, a DEC business analysis manager for the Systems Software Group.

The volume discounts are designed to encourage sales of the new low-end Vaxcluster systems, Gallozzi said, adding that the discount program "seems to align itself with the theory of work groups." He said that DEC customers have been requesting volume discounts. "Customers want a way to buy large volumes of software at a reduced rate," Gallozzi observed.

Under the discount plan, software must be purchased in multiples of eight, with the highest volume package, so far, set at 192, Gallozzi said. For example, an MIS manager could purchase a 32-unit bundle of Fortran for 30 Vaxstation IIs using one order number. If the customer is eligible for a DEC discount of 18% on such acquisitions, the cost would be $68,329 for 32 bundled Fortran licenses, as opposed to $83,328 for 30 separate licenses, according to DEC.

First endeavor

"This is our first endeavor into high-volume discounts. We want to monitor the results," Gallozzi said. He declined to comment on whether high-end VAX hardware users may benefit from future DEC software volume discounts.

Another software plan, the VAX Software Portfolio, was also announced. The portfolio gives users a large number of software development and information management products for a flat fee per month, per system, under a renewable annual agreement.

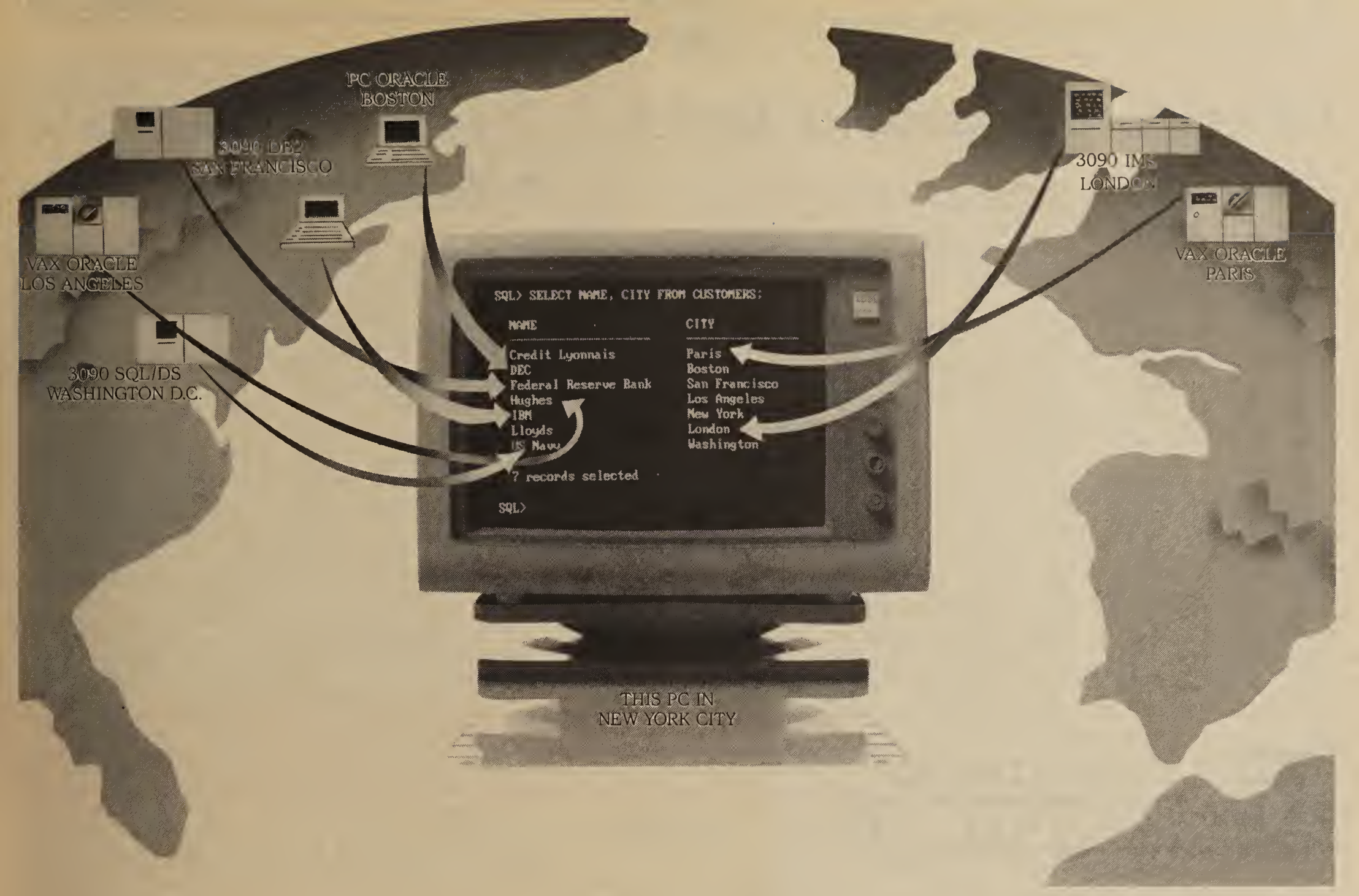
The portfolio licenses systems to use any of the products in three separate packages, according to the vendor. Should a portfolio customer wish to run software on a system, only the media and documentation kits need to be ordered, as the licensing is already in place.

The portfolio program includes three packages — the base program, the extended program and the program development runtime-only portfolio.

The base program includes language compilers, software development tools and information management tools — 29 products — required for software development and information management. The base portfolio costs $160 per month for a Vaxstation II and $640 per month for a Microvax II, according to the vendor.

The extended portfolio includes additional, specialized languages and tools such as Ada, OPS-5, LISP, the VAX Cobol Generator and DEC's VAX-to-IBM-data access, known as Vida. It costs $225 per month for a Vaxstation II and $900 per month for a Microvax II.

The runtime-only portfolio is available for only Microvax II computers. It consists of a runtime library and can be used with applications that have been developed using DEC's Application Control and Management System, Data Base Management System, VAX/Relational Data Base Management System and others. The cost is $200 per month. Volume discounts and portfolio software programs are available immediately.



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U.S. high-tech practices decried

FJCC hears Perot blast at industry

By Donna Raimondi

DALLAS — While computer engineers and technicians gathered at the Fall Joint Computer Conference (FJCC) here to study future technologies, conference speakers decried business policies and a national lack of commitment to computer science.

The U.S. faces tough international competition for technological leadership and is losing because of the way business operates, said H. Ross Perot, founder and chairman of Electronic Data Systems Corp. Perot spoke to 1,200 attendees at FJCC, the first joint conference of the Institute of Electrical & Electronics Engineers (IEEE) Computer Society and the Association for Computing Machinery (ACM).

Instead of operating through procedure manuals and preconceived notions of what makes a good employee, businesses should hire creative individuals who will infuse the computer industry with new ideas, he declared.

"If we did not have such a thing as an airplane today, we would probably create something the size of NASA to make one," Perot said. "It's a good thing the Wright brothers didn't know any better when they made the machine fly."

Instead of promoting legislation that will inhibit worldwide competition, U.S. computer scientists should hit it head-on with creativity, according to Perot. "When people focus hard and work on teams to accomplish a goal, they pursue problems until they are resolved."

The computer industry perception that research should be undirected and undisciplined is slowing progress toward the complete revolution the U.S. needs in networking, parallel processing, artificial intelligence and supercomputing, said C. Gordon Bell, assistant director of the National Science Foundation's Computer and Information Science and Engineering Directorate.

"Our competition has clear goals and directives for supercomputing," he observed. "We need to raise our aspirations and revise our thinking out of the VAX mentality."

To satisfy U.S. scientists who require ever-increasing computing cycles, the industry must mass-produce supercomputers, said Kenneth Wilson, professor of physics at Cornell University in N.Y. and recipient of the 1982 Nobel Prize in physics. If the U.S. is to satisfy its own needs, it can no longer wire each supercomputer by hand, as Cray Research, Inc. does.

"The same capability that produced the 1M-bit memory chip has to be put into producing complete systems for scientific computing," he said. "Don't focus on the fastest processor — focus on the lowest cost processor with the right capabilities, like parallel systems."

Supporting supercomputing is not enough, said John Hopcroft of Cornell University, one of two recipients of the A. M. Turing Award presented by the ACM. "Today, there is a global struggle for technological leadership," he said. "Unless we develop a national policy to support computer science, we will allow other countries to overcome us."

There are not enough well-trained computer scientists in the U.S. to bring about technological leadership, several speakers noted.

Business in the U.S. is "eating its seed corn" by luring talented young engineers and computer scientists out of college before their education is finished, said John Fitch, associate director of the Association for Media-Based Continuing Education for Engineers. "The graduate students in this country are foreigners. Who will teach?" he asked.

At least 20 companies, including IBM and Digital Equipment Corp., are solving the education dilemma by bringing in master's degree-level courses for their workers via satellite from the 4-year-old National Technological University, based in Fort Collins, Colo., noted Lionel Baldwin, the university's president.

NEC laptop claimed to answer to users' needs

By David Bright

NEW YORK — Joining the growing list of vendors testing the laptop computer market, NEC Home Electronics, Inc. last week introduced a less-than-12-lb IBM Personal Computer-compatible laptop system designed for business users.

Sales of laptop systems have consistently fallen short of industry predictions, but according to NEC Computer Products Division officials, the company took great pains to tailor its new system to market requirements. "We consulted potential end users of a NEC MS-DOS PC through extensive market research and focus groups to find out what kind of machine the marketplace wanted," Senior Vice-President Keith Schaefer said.

Called Multispeed, the $1,995 system operates at either 4.77 MHz or 9.54 MHz and includes a high-contrast LCD display, 640K bytes of random-access memory and five built-in application programs.

"The price is really interesting, very competitive," said Larry Lefkowitz, an associate editor with Datapro Research Corp. in Delran, N.J. But with IBM, Toshiba Corp., NEC and several other vendors now competing, the laptop market needs greater definition, Lefkowitz said. "I don't understand where these vendors are going in the laptop market. I don't know where the profits are, especially if they have to continue lowering the prices in order to market them."

Compaq Computer Corp. is reportedly showing a 15-lb laptop system to dealers to gauge its market potential. That machine is said to include an Intel Corp. 80286 microprocessor, a highly readable gas plasma display, a 5¼-in. floppy disk drive and two expansion slots. Analysts said they expect that machine, in the Compaq tradition, to be fairly expensive.

Beginning in December, NEC plans to market the Multispeed through computer retail chains and value-added resellers.

The NEC V-30-based system is powered by a built-in nickel cadmium battery said to supply four to six hours of work time and includes an AC adapter. Other features include a detachable, 80-col. by 25-line LCD display with a resolution of 640 by 200 pixels, an 85-key keyboard with a separate numeric keypad, two 3½-in., 720K-byte floppy disk drives, an RS-232C port, a parallel printer port and an external data transfer port. When the Multispeed is used as a desktop machine, the display can be replaced with a red-green-blue video monitor, NEC said. A 300/1,200 bit/sec. Hayes Microcomputer Products, Inc.-compatible modem, PC data transfer package and carrying case are optional.

In addition to a setup utility, the system's 512K bytes of read-only memory holds five programs, four of which pop up in windows within other application programs.

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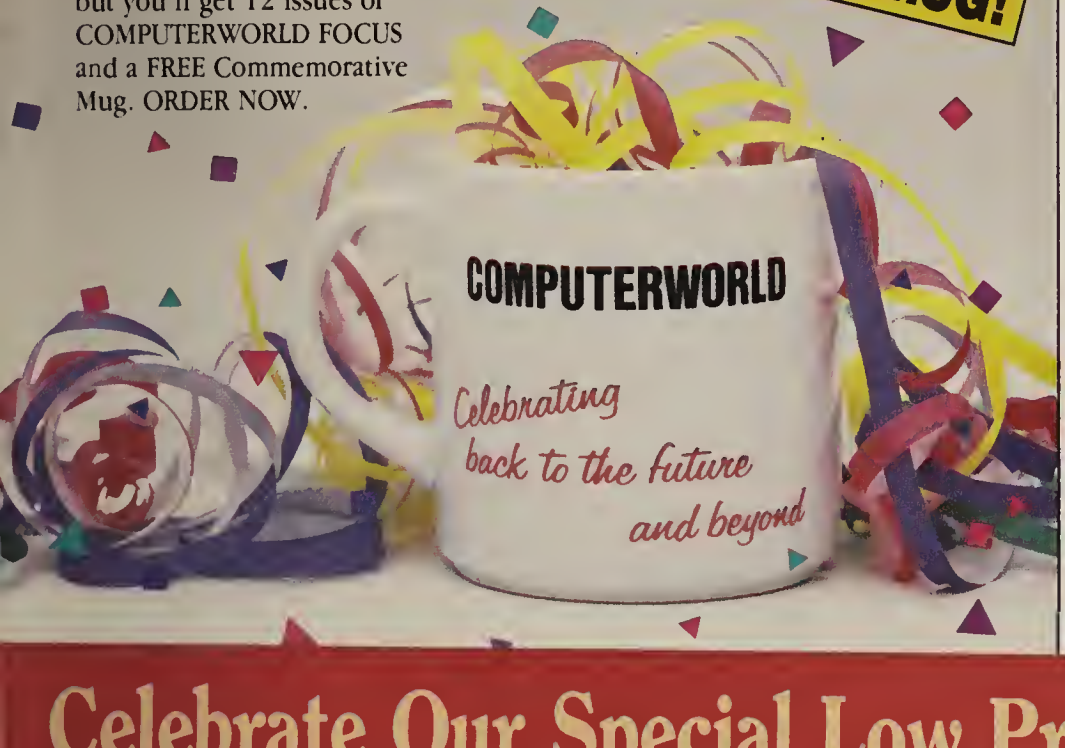

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C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

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Racore enters networking with three additions

By Eddy Goldberg

LOS GATOS, Calif. — Racore Computer Products, Inc., best known for selling add-on devices for the ill-fated IBM PCjr, jumped into the networking business last week with low-cost network adapters.

Racore introduced Lanpac II, a network system designed for Novell, Inc.'s Advanced Netware, and Lanpac 802.5, an adapter that can be mixed into an existing IBM Token-Ring network.

The company also announced a diskless workstation incorporating optional Lanpac network circuitry for use in an IBM Personal Computer AT-compatible network.

The Lanpac II card, available for $295, reportedly provides networking capability at selectable speeds of 4M, 8M or 16M bit/sec. It can be connected in either a linear bus or star configuration, using coaxial or twisted-pair cable.

Novell Advanced Netware software includes IBM Netbios emulation, providing Lanpac II users with IBM PC network compatibility as well as increased performance, according to Racore President John LaPorta.

'Extremely fast'

"It's extremely fast when benchmarked against other networks," LaPorta said. "It allows users to get a local-area network board going 20% to 30% faster than the next closest product for a very low cost."

Depending on the configuration, up to 250 Lanpac stations per cluster can be connected, with up to 1,000 feet between stations, Racore claimed.

Lanpac 802.5, available in limited quantity for $495, transfers data at 4M bit/sec. using coaxial cable or twisted-pair wiring. The product uses IBM network software, versions of IBM PC-DOS that are capable of supporting networks or Novell Advanced Netware. Full availability is scheduled for early January.

The Lanpac 802.5 card can be added to an existing IBM Token-Ring network. It will also provide the advantages of some higher level IBM Systems Network Architecture protocols for connecting to mainframes, LaPorta said.

Intel processor

The diskless workstation, which comes with built-in networking capability, uses an Intel Corp. 80286 processor operating at either 10 MHz or 12 MHz.

It is available with Lanpac integrated onto the main processor board and can accommodate up to 2M bytes of memory.

LaPorta said sharing the 80286 CPU between the workstation and the network cuts the overall cost of the workstation and also provides performance gains because of reduced I/O requirements.

The diskless workstation is currently available in limited quantities for $850 to $1,525, depending on configuration.

Production shipments are scheduled to begin in January.

Lotus to ship unprotected edition of 1-2-3

By Mitch Betts

ARLINGTON, Va. — Officials at Lotus Development Corp., submitting to the military's refusal to buy copy-protected software, announced last week they will ship an unprotected government edition of Lotus's 1-2-3 micro spreadsheet software by the end of the year.

The unprotected software and a new government customer support program are intended to increase Lotus's penetration of the federal marketplace, according to Stephen J. Crummey, senior vice-president of sales and service.

U.S. Department of Defense regulations specify that software purchased by that agency must be unprotected so it can be easily loaded onto a hard disk during a crisis. Some civilian agencies also have rules against the purchase of copy-protected software.

For the new government edition, Release 2.01, traditional copy protection is replaced with a start-up screen that is intended to discourage illegal copying. The screen states that the licensed software is U.S. government property and cites the relevant regulations against duplication.

> ***'We feel comfortable about removing copy protection from our software for government customers.'***
>
> — Peter Simon
> Lotus Development Corp.

"We feel comfortable about removing copy protection from our software for government customers because the U.S. government has strong software protection policies in place," said Peter Simon, general manager of Lotus's business applications group.

The government edition of 1-2-3 will be available from Technical Services, Inc. in Chantilly, Va. — Lotus's distributor for federal agencies — and from major hardware vendors. A government edition of Symphony, an integrated software package, will be available next year, officials added.

Hoping to foster a closer relationship with major government customers, Lotus also instituted a Government Access Program that includes a special support hot line for government customers, beta testing of new products and agency briefings about products under development. Crummey said agencies want to be assured that their investment in existing Lotus software will be protected in the future.

Crummey added that Lotus hopes the government will be a good market for its new technical word processing software, called Manuscript [CW, Oct. 27]. He said applications could include procurement documents and legislation.

Phoenix to bring VP/IX to Microsoft system

Software to run under Xenix System V/386

By David Bright

NORWOOD, Mass. — Phoenix Technologies, Ltd. and Microsoft Corp. last week announced that Phoenix will develop its VP/IX virtual personal computer environment for Microsoft's Xenix System V/386 operating system.

With VP/IX installed on Intel Corp. 80386-based systems, existing Microsoft MS-DOS applications will be able to run as tasks under Xenix System V/386, the two companies said. According to Phoenix, the agreement will help manufacturers bring their systems to market more quickly. Phoenix plans to begin shipping VP/IX to OEMs in the first quarter of 1987.

Those manufacturers may have the product available as early as March or April 1987, according to Rich Levandov, Phoenix vice-president of strategic operations.

In addition to developing VP/IX for Xenix System V/386, Phoenix will license MS-DOS 3.2 and offer it to OEM users and will develop peripheral device drivers supporting Microsoft's Windows graphical interface.

"We see a demand for VP/IX among the Xenix users of 386-based systems who will want to tap the vast library of applications already written for the MS-DOS operating system," said Steve Ballmer, Microsoft vice-president of systems software.

Microsoft Chairman Bill Gates called the agreement "a step forward" for Microsoft customers. "Through cooperation with developers of software such as VP/IX, we can more rapidly integrate MS-DOS-based applications software into new architectures and environments," he said. Phoenix will also license MS-DOS 3.2 for VP/IX customers using AT&T Unix System V Release 3.0.

Early users of optical disks

From page 1

companies, to bring the paper images past the reader instead of making the reader look them up in file cabinets.

Fewer than 15,000 optical disk drives of all types were shipped in 1985; more than half of those were read-only drives, mostly of the compact disk/read-only memory (CD-ROM) type, according to the 1986 Disk/Trend, Inc. report on optical systems. Optical disk technology — commonly available in small systems and microcomputers in the form of CD-ROM — still has not caught on for medium and large system storage.

By far the most popular use of existing optical technology is in document and image storage. "Up to now, document storage has not been very computerized," says Lew Cowan, editor of *Optical Memory News*, a Rothchild Consultants publication in San Francisco. "Documents are stored primarily on micrographics or paper. As a result, that industry has been much more receptive — much sooner — to write-once technology."

Huge optical document storage projects have blossomed, such as the joint Army-Air Force contract awarded to AT&T for a system to store, retrieve and transmit digitized engineering data. When finished, the optical disk jukebox part of the storage project will store approximately eight million C-size engineering drawings in two jukeboxes.

University gets grant

Syracuse University in Syracuse, N.Y., won a four-year, $3.7 million grant from the W. K. Kellogg Foundation, $400,000 of which will fund an optical disk system that will store the equivalent of 65 million pages of text and photographs tracing the origin and growth of the adult education movement.

But as a means of data storage, few users want optical devices unless they are based on standards and are easy to integrate into existing computer systems. It is more common to find small evaluation projects of one or two optical drives that companies examine while they wait for standardization of media and drives and erasable media.

For example, Dow Chemical Co. systems design engineer Bob Winchester is running two optical disk subsystems "to find out if optical technology is sufficiently developed to start using as storage." The systems are being used in place of disk drives. Winchester has been testing a 5½-in. Optotech, Inc. drive on an IBM Personal Computer and a 13-in. Opticon 1000 with KOM software on a DEC Microvax II.

MIT's Lincoln Laboratories in Lexington, Mass., has a DEC VAX-11/780 with an Optimem 1000 drive, Perceptics' Laserware software and an Emulex Corp. controller. Lincoln Labs is having some problems integrating its optical systems but wants to be ready to implement the technology when it is reasonable to do so, says staff member Robert Lang, who is in charge of the project.

By 1991, the worldwide market for optical data disk drives will top $2 billion at OEM price levels, according to a report from Freeman Associates in Santa Barbara, Calif. But finding current users is a challenge. Most companies are adopting a "wait-and-see" attitude before venturing into optical data storage.

Start looking now

That attitude could turn out to be a disadvantage when the technology becomes widely available. "If a company has very large data bases, particularly if they are transaction-oriented data bases of the type that a large insurance company might maintain, they probably ought to start looking at optical storage just so they can keep up with their competitors," advises Robert Katzive, vice-president of Disk/Trend in Los Altos, Calif. Companies that are actively evaluating optical storage now will gain a real advantage by being able to offer their customers improved service levels, he adds.

Optical disk drives have a lower cost per on-line megabyte than current tape devices. Used instead of tape for archival purposes, optical units are said to drastically cut the amount of space data is stored on and require less care than tapes.

Optical devices reduce access time significantly because data can be accessed randomly instead of sequentially, unlike tapes. The devices are also faster to mount than reel-to-reel tapes. The media itself is stronger than magnetic tape or disk — some analysts say it would take hammer blows to damage it.

Although optical technol-

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Security Pacific banks on optical disk systems

LOS ANGELES — Money transfer functions at Security Pacific Automation Co. — the data processing arm of Security Pacific National Bank — used to set workers adrift in a sea of paper, according to Rodney Myers, first vice-president.

"Staff would have to run from one file to another to a third and fourth to put together all the pieces that made up a transaction," Myers says. Now, the employees can view all pertinent documents at their optical disk subsystems workstation without leaving their desks.

The 25% to 35% gain in worker productivity has allowed Myers to make significant reductions in staff.

Security Pacific Automation has two Filenet Corp. optical disk systems — a year-old unit devoted to money transfers and an incoming system that will automate personnel and benefits functions.

Each is composed of a scanner, an optical disk storage and retrieval unit with software that manages images, workstations (that come from Filenet in IBM 3270- and Digital Equipment Corp. VT100-compatible models) and a 12 page/min., 400 dot/in. laser printer. Each holds 64 2.6G byte-capacity double-sided 12-in. disks, which store up to 52,000 pages of images apiece.

The systems provide historical documentation for every transaction in the functions that are automated. For instance, if an international money transfer takes place but the money does not show at the receiver's end, Myers' staff can call up on their workstations all the documents related to the transfer that have been scanned into the storage system as the transaction took place.

The technology is not perfect, Myers acknowledges. The scanners are limited to 8½- by 11-in. and 8½- by 14-in. documents, and they are slow. The optical subsystem itself cannot be used remotely, and the Filenet systems with the 64-disk minimum are too large for some applications, making it difficult to cost-justify moving those applications to their own subsystem.

All of those problems are being addressed. Myers expects to be able to automate check processing in the next year and to eventually use the systems for bank card functions. Filenet is working on a remote facility for the subsystems that will allow smaller jobs in remote locations to be added to the big systems and let the bank's statewide real estate business use the technology.

"We don't think that with the applications we have on right now there is necessarily a competitive advantage," Myers says. "But when we add the check processing and bank card functions, we will certainly have the potential to be in the 'least-cost provider' position."

— **Donna Raimondi**

Big Blue's optical game keeps users, analysts in the dark

By Donna Raimondi

Many potential customers are waiting for IBM to show its hand in the optical storage game.

Several analysts and users say Big Blue is working on the technology, but nobody can say when, if ever, a product will evolve. "IBM is interested in optical storage technology," an IBM spokesman says, but he would not comment on whether a product is under development.

Analysts agree that if IBM does announce a product, it is likely to become a standard no matter how many vendors agree to a different standard first.

"Either a dominant company creates a standard — and IBM can certainly do that — or the industry gets together and agrees to set a standard," Robert Katzive, vice-president at Disk/Trend in Los Altos, Calif., says. As it now stands, there are as many types of media as there are drives, he adds.

In the meantime, integration vendors are writing interfaces for the Digital Equipment Corp. environment but not for IBM's, says a spokesman for Perceptics Corp., a Knoxville, Tenn., optical systems integrator. "All the developers are afraid of what IBM is doing, so they write for the VAX because it's more conducive to third-party development," he explains.

Data General Corp., one of the few computer vendors to offer optical disk subsystems as options for users of its 32-bit minicomputers, finds there is much customer interest but few orders for the devices. "It's a niche product," says Peter Roche, product manager of peripherals for special systems at DG.

Of the major large computer system vendors, only Sperry Corp. has an optical option — for its 1100 series mainframes. Honeywell, Inc. says it has seen no user demand, the criterion that would propel it to offer optical subsystems.

Control Data Corp., while offering no optical storage devices for its systems, owns a 49% share in optical vendor Optical Storage International.

Aside from DG, superminicomputer vendors have not jumped on the optical bandwagon, either. Of the traditional vendors, neither DEC, Wang Laboratories, Inc. nor Prime Computer, Inc. offers an optical storage option, although DEC does offer compact disk/read-only memory on its Microvax and microcomputers.

The technology will most likely take off at a much faster rate when erasable disks are available, which is expected by 1989.

Drive manufacturers are guarded about their work to build erasable drives while erasable media is not widely produced. "The technology is there, but the manufacturing plant is not," Katzive says.

Early users of optical disks

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ogy is good for backup, archiving and, in some cases, transferring information — distributing data bases, for instance — difficulties with the technology must be overcome before MIS managers will accept it. "It is difficult to interface an optical disk with a system that has a complex operating environment," Disk/Trend's Katzive says. Write-once optical drives are only capable of writing to a particular physical location, he adds.

The performance of the optical disk drive is not as good as that of a magnetic disk drive; the optical drive has longer access time and a slower data transfer rate. Lack of standardization is also a limiting factor in the growth of the optical industry, Katzive says.

At Dow Chemicals, the KOM implementation on the Microvax is reliable backup media, Winchester claims. "The only penalty to optical technology on the Microvax is slower performance over normal disk drives," he says.

Winchester cautions that while optical disks are certainly worth investigating and using, most of them are in a fairly undeveloped state. "You can't buy software for your favorite computer and just use optical drives on it," he says. "Software houses have made it possible on DEC systems for optical use to be fairly automatic, but that is not true for other computers, like the IBM PC."

Users of equipment other than DEC's should be prepared to do some low-level programming. "There are many things that you will want to know that the vendors are not willing to tell you because of the competition among vendors," he warns.

There are problems with the technology, Lang admits. However, "It's a lot easier to store one optical disk than it is to store six magnetic tapes at 6.25K bit/in. or 30 tapes, or whatever, at 1,600 bit/in. and twice that for 800 bit/in.," he claims. While that is clearly a significant advantage of optical systems, the major drawback, Lang says, is the write-once aspect. "If you create a huge data set, and a READ or WRITE problem is persistent, then that is a real problem."

VIEWPOINT

EDITORIAL

Demanding connections

Last week marked yet another chapter in the telecommunications saga, a chapter whose importance should not be overlooked.

In a Washington, D.C., suburb gathered representatives from the divested Bell operating companies and their research arm, Bellcore, as well as from communications vendors, user companies and users groups. Their agenda: shaping what is acknowledged to be *the* major network design issue of the next decade, better known as Open Network Architecture.

This first meeting of the Open Network Architecture Forum served, as its name would indicate, largely as an arena in which users and providers of communications services could air their views on what is needed to help ensure a truly open and competitive telecommunications environment — one that allows virtually anyone, customer or competitor, to tie into the local telephone companies' networks.

While the meeting was hosted by the operating companies, they certainly had no motivation to initiate it. In fact, that came from the Federal Communications Commission, which first mandated that AT&T and its regional offspring provide such open architectures as the key requirement for further deregulation, and then strongly suggested the telephone companies solicit industry and customer input before drawing up the specifications for such schemes.

One can hardly overestimate the significance of ONA for users of communications services. No longer would companies be forced to buy the full package of services offered by a carrier, regardless of what pieces of it they required; with ONA, users could pick and choose only those service components they needed, customizing their networks and reducing their costs.

The compatibility promised by an Open Network Architecture is so clearly the direction in which the information processing industry is moving — witness the predicted demise of proprietary computer architectures — that one can hardly imagine anyone resisting it. In the communications arena, both users and equipment vendors are pressuring service providers for greater compatibility: Users do not want to be limited to a single service source, and equipment vendors do not want to create a different interface for each provider's service.

Yet at last week's meeting, the divested Bell operating companies response to users' demand for a single common architecture was disappointing. While the operating companies know that users "need the highest degree of technical commonality," said a spokesman, it is not likely that all seven will file identical plans, so the goal is "similarity of connections."

Perhaps "similarity of connections" is all we can reasonably expect, perhaps not. But buyers of communications services — MIS and communications managers — deserve, and must demand, clear and detailed explanations of what is and is not technically feasible and must continue to push providers to wake up to the realities of today's marketplace. The ONA Forum is an excellent vehicle for doing so, and we urge MIS managers to use it as such.

LETTERS TO THE EDITOR

NTT not a closed telecom market

In your article, "NTT predicts flat U.S. telecom purchases" [CW, Sept. 29], Gartner Group, Inc. analyst Fritz Ringling was quoted at length downplaying the significance of Nippon Telegraph & Telephone Corp.'s (NTT) efforts to procure communications equipment in the U.S. "Nothing has changed," he charges and goes on to glumly predict that NTT "will buy nothing from the U.S. but broomsticks." Motorola, Inc., the analyst adds, "took 10 years to sell something like 100,000 pagers."

Far from buying nothing, NTT has spent more than $500 million for equipment from U.S. companies in the past three years. Purchases have steadily risen from $18 million in 1980 to more than $178 million last year. The fact of the matter is that today NTT is often cited by trade experts as an example of just how open the telecommunications market in Japan is becoming.

Your readers should also know that the purchase of Motorola pagers was not, as was implied, an unprofitable one-time arrangement. To date, NTT has bought more than 400,000 of these units.

The New York Representative Office of NTT will continue to publicize procurement offerings and encourage U.S. companies to look beyond outdated perceptions of NTT being a closed market. NTT regards the U.S. telecommunications and computer industries as a very valuable and expanding source of supply for a wide range of sophisticated products.

Kiejl Tachikawa
General Manager
NTT
New York

Considering the best in windowing

Tracy Licklider's article, "Windowing software shatters users' hopes" [CW, Oct. 6], omitted from consideration one of the earliest and, in my opinion, among the best windowing and multitasking software programs around. Not only does it require fewer bytes to load than any of those Licklider listed, it offers up to nine separate DOS windows, cut-and-paste and macro capabilities and is certainly as easy to use as Softlogic Solutions, Inc.'s Doubledos, while offering much more in the way of flexibility and customization. The program is APX Core Executive by Application Executive Corp. I have been using it for years with much satisfaction. Xyquest, Inc.'s Xywrite runs under it.

I think Licklider should also have included in his review another product from Softlogic Solutions, called Carousel, which, while not multitasking or windowing software per se, offers an approach that may well meet the needs of many people who are considering windowing or multitasking software.

It essentially offers a series of DOS partitions that are bank-switched in and out. It has the advantage of not robbing memory for applications, but since it is not multitasking, it requires a finite, albeit small, time to switch applications. Again, depending on memory (and Carousel uses both expanded and extended memory), one can have a large number of applications simultaneously loaded and ready for switching.

Morton F. Kaplon
Easton, Md.

Federal Express, Tandem and DEC

I take strong exception to the implications in the article, "Federal Express cancels Zapmail service" [CW, Oct. 6]. The report references sources that make it sound as though Tandem Computer, Inc.'s equipment was not performing satisfactorily and that a Digital Equipment Corp.-based system was the solution.

Despite the changing Zapmail network requirements, Tandem equipment and personnel performed quite well. DEC was to be used in only one small part of the satellite network. It would be misleading to imply that somehow DEC was the solution and that Tandem failed us. We have a very high regard for both vendors and will continue to use their products and services where appropriate.

James L. Barkdale
Executive Vice-President
Federal Express Corp.
Memphis, Tenn.

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VIEWPOINT

Employee productivity: Big Brother is monitoring you

As my father would say in his best Damon Runyonese, "What's the beef?"

It seems that 9 to 5, the National Association of Working Women, issued a report earlier this year disclosing that keystrokes, bathroom breaks and other activities of VDT users are increasingly being monitored by computers.

"Computers can prompt workers to work faster, automatically present their next piece of work and warn them they're falling behind predetermined production standards," the report stated. "The computer can record when an operator turns on or off her VDT, count keystrokes by the second, time customer service transactions and track the number of operator errors per day."

Checking, monitoring and assessing

In fact, as *The Wall Street Journal* reported recently, Norwegian Caribbean Lines gets a printout on the half hour assessing reservation agents' work, mainly to check who's doing the best work. Eastern Airlines monitors the number of calls taken by its 6,000 agents, the number of seats sold and average call-handling time. Southern Bell Telephone & Telegraphic Co. monitors operators' calls.

Schneiderman has been covering the computer and electronics industries as a reporter and editor for more than 20 years.

Is this bad? Employers like it, claiming that VDTs and other computer technologies increase productivity. But 9 to 5 doesn't like it, warning that computer monitoring invades workers' privacy, leads to unfair performance evaluations and increases stress, while it reduces human contact and workers' control over their work.

Maybe, maybe not. The output of all this productivity is information. How important is the information? Is it equally important as the invasion of privacy? Has the quality or the relevance of the information been measured? Can it be measured?

By RON SCHNEIDERMAN

Does monitoring of data entry workers invade their privacy? I don't think so. No more so than when telephone companies monitor their operators' conversations to make sure they're doing their jobs properly, and that's been going on for years. Presumably, telephone operators aren't having private conversations; they're working.

Does it lead to unfair performance evaluations? Not likely. After all, advertising salesmen make out reports on virtually every call they make, either by phone on in person, whether or not they close the sale. (This is measured productivity, I think). Ad managers call their salesmen to check on their performance. Calls by telemarketing sales personnel are counted, even monitored occasionally, by supervisors. Writers are edited. Professional football players and other athletes are constantly being "monitored" on film and by people standing over them.

In a somewhat different but related type of monitoring, it was recently disclosed that insider trading involving a Wall Street merger specialist came to light as a result of computer monitoring of trading at the New York Stock Exchange and the National Association of Securities Dealers. The exchange's Intermarket Surveillance Information System (ISIS) accumulates data on every trade in every stock listed on the Big Board and the American Stock Exchange. This creates an audit trail, enabling the exchange and Amex to trace both the buying and selling firms in every trade.

In September, the Chicago Board Options Exchange turned over computer tapes to the Securities and Exchange Commission when the exchange detected what it thought was unusual activity in trading of options in CBS, Inc. stock.

Does the VDT monitoring of personnel reduce human contact? Probably no more than when we were using typewriters; now output can be monitored in real-time.

The 9 to 5 organization also says, "When a machine warns a secretary the moment she is slowing down, disciplines a clerk when he makes a mistake and continually tallies a worker's performance, it is impossible for the employee to control his or her work load or work pace." The report further notes that video terminals have largely replaced personal interaction with managers.

Making procedural changes

All that may be true at the outset. But if the VDT operator must be interrupted constantly to correct mistakes, either he or she won't be around for very long, or someone should make some procedural changes to correct the problem.

In practice, computer monitoring of productivity doesn't seem much different than a time and motion study, and it may be a lot simpler. If that's the goal, then one possibility would be to set performance standards (already required at some organizations) and incentive rates.

That, of course, requires considerable judgment and experience and may not go over very well, even with the top VDT operators in the shop. It would, at least, give the operators a minimum acceptable performance level until we can figure out what information is really worth and can evaluate its timeliness.

Challenging the hidden assumptions of problem solving

There's a Unix expert who runs workshops for MIS managers. Early in his program he shows his audience a report. Then he asks, "How long would it take your staff to change this report to print it four columns farther to the right?"

"Two weeks," comes the answer. "Four days." "Three months."

"Now," the expert continues, "how long would it take if you didn't have the source code?"

"Can't be done," is the usual response. "No way." "Have to rewrite from scratch — two years."

Our hero steps to the keyboard, types one line, and voila! The report is four columns over.

On the surface this is a triumph of Unix over traditional DP tools. But let's look a bit deeper.

The traditional DP environment

The MIS managers assumed the report-creating program had to produce the final, shifted report directly. Nobody said so, but this is the way programs work in the traditional DP environment. Therefore, this is the way people think when they have spent their careers in the traditional DP environment.

Mallach is associate professor of computer science at the Boston College School of Management and a consultant to top managers of vendor and user organizations.

The Unix approach pipes the original report to a second program. The second program puts four blanks at the beginning of each line, then sends them to be printed. Unix naturally works this way. It provides utilities to change strings on the fly. It hides intermediate files from the user. Unix users often combine many standard utilities in this way, with a small amount of "real programming." People think this way when they have spent their careers in the Unix environment.

By EFREM MALLACH

Neither of these mind-sets is necessarily the way things have to work. What would we do with a Unix mind-set in the traditional DP world?

First, we would send the report to a temporary file instead of to the system output queue. This is a one-line JCL change. Give it two minutes.

Second, we would write a tiny program to read a print file, put four blanks at the head of each line and print the result. This takes 10 lines of PL/I or perhaps 20 of Cobol. Elapsed time: 10 minutes.

Third, we would write four lines of JCL to encapsulate the report creation and the shifting into one user-visible procedure. Total elasped time: 20 minutes.

Granted, 20 minutes is about 19 minutes and 40 seconds longer than the Unix expert took. Unix filters and pipes have their value. (They often also have a run-time penalty because of their generality.) But 20 minutes without source code is a darn sight better than "Can't be done," "Have to rewrite the application from scratch" or even "Two weeks." What took it from "impossible" to 20 minutes? Only the mind-set we brought to the problem. Nothing else.

Every day of our lives is full of opportunities to break out of our conventional mind-sets, cast off unvoiced assumptions about the way things are supposed to be and obtain dramatic improvements in the way our systems work.

Does it take hours every night to pull the next day's orders out of a large future orders file? Then each weekend, split the file into orders that are more than one week in the future and those that aren't. Put the future orders on a tape and forget about them until the next weekend. When you have time, merge the tape with your on-line file, which now includes the future orders that came in during the week, and split the result again. An instant saving of two hours per night, just by dropping the unstated assumption that all future orders have to be in one file.

Once I had to line up questions and answers of difficult lengths in parallel columns, each question opposite its answer. None of my available word processing packages could do this. I used a graphics package that could put text in boxes for making sidebars and annotating drawings. I drew two columns of boxes, put words in the boxes and then hid the boxes. When I had to edit the text, I brought back the boxes, resized them as needed, edited the text and hid the boxes again.

Dropping assumptions

Effort? Small. Results? Perfect. What assumption did I drop? That only word processing software can process words.

Now it's your turn. What are your most pressing current problems, large or small? Chances are, they're neither shifting reports four spaces to the right nor lining up questions and answers. But they matter to you. There is a hidden assumption you can discard, a change you make in your mind-set that will give you a breakthrough.

Ask yourself what assumptions you have made about the solution. Challenge your assumptions. Let your mind roam free. Find an innovative solution. Tear down your mental inhibitions. Do the impossible in 20 minutes. The rewards are there. Go get them!

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SOFTWARE & SERVICES

SOFTLINE
James J. Hobuss

Plea for a new structure

Managers in information services departments have a tremendous capacity to affect the corporate objectives of their parent organization.

The extent to which that capacity is leveraged is dependent upon these managers' ability to implement profit-enhancing, new applications as quickly as it is feasible with the fewest possible bugs.

Fast application development, however, is becoming increasingly more difficult to achieve. Although computing costs have decreased sharply over time and computer applications are becoming more justified, program development costs have risen sharply. The applications that are developed often take too long and contain too many errors.

The end-user computing revolution has not proved to be the aid to systems development departments that it was purported to be. Users are more educated now in terms of information requests, and their requests have become more sophisticated. The backlog of requests merely highlights the large portion of programmers devoted to heavy maintenance projects on existing systems.

New approaches must be implemented if information services organizations are to be more responsive to the sophisticated demands of the user base. Although the information center was implemented to increase the penetration and effectiveness of end-user computing tools, a new structure needs to be

See **PLEA** page 22

Hobuss is senior project manager and systems specialist at U.S. National Bank of Portland, Portland, Ore.

Publishers await system

Publishing firms have high hopes for integrated tool

By Ninamary Buba Maginnis

HAWTHORNE, N.Y. — Michael Stock is building expert systems for complex industrial processes that have thus far eluded automation.


Michael Stock

Stock, with a team of engineers, has already created Expert Publishing Systems, a highly complex, comprehensive, integrated newspaper production application, for Composition Systems, Inc. in Elmsford, N.Y.

The Expert Publishing Systems with all modules will retail for about $600,000 to small newspapers, $1.25 million for medium-size newspapers and $2 million to large newspapers, Stock said.

The system runs on the Digital Equipment Corp. VAX line of computers.

The system, which took three years to produce, has automatic page composition and pagination and integrates newspaper production steps. When changes occur, every department is updated instantaneously because everyone works from a common data base.

"There are systems that do certain functions of a newspaper, but this encompasses everything from copy entry to press configuration — all page makeup," notes Laurel Brunner, director of research for the Malibu, Calif.-based Seybold Publications, Inc. "Eighty-five percent of a newspaper can be put together by the system. He's integrated the whole system."

"It's tremendously ambitious. I've been looking around for a comparable system, and nothing comes close to it," notes Esther Dyson, editor of the New York-based newsletter "Release 1.0." "There are plenty of newspaper automation systems out there but nothing selling to a newspaper of this magnitude."

Dyson says that enthusiasm for the system must be tempered because it is being prepared for beta test and is not cur-

See **PUBLISHERS** page 26

Report says IBM to unveil smart disk controller to speed DB2

By Charles Babcock

SAN JOSE, Calif. — IBM is developing an intelligent disk controller that could greatly speed DB2's ability to access records, according to West Coast consultant Thomas J. Bird and an associate, William H. Inmon.

Through contact with clients and familiarity with the IBM Jupiter project in Santa Teresa, Calif., Bird says he believes the announcement of the product will come in November, but that prediction represents slippage from an earlier prediction that it would be brought to light by the middle of October.

Furthermore, IBM spokesmen have denied that release of an intelligent disk controller is imminent. The physical access of data will remain a software function of DB2 executed on general-purpose hardware, according to Robert Berland, IBM's director of strategic planning.

"Intelligent disk controllers are going to change the way that I/Os are serviced and, in doing so, change the fundamental performance equation between mechanical and electronic operations," Bird and Inmon wrote in a privately circulated report, "Performance and Independence — Implications of the Intelligent Disk Controller."

Bird is president of Innovative Designs, a nine-person consulting firm in Redwood Shores, Calif., which advises Bank America Corp., Security Pacific Corp., New York Telephone Co. and other companies on

See **IBM** page 23

D&B Computing develops windowing for Nomad2 4GL

By Alan Alper

WILTON, Conn. — Taking a cue from the microcomputer software industry, D&B Computing Services, Inc. is developing a windowing environment for Nomad2, its fourth-generation language and data base management system for IBM mainframes.

Called Nomad Windows, the facility provides a microcomputer-like windowing environment for Nomad2 users who are using the fourth-generation language to develop applications or for reporting and data management, according to the Dun & Bradstreet Corp. subsidiary.

Nomad2 runs under a variety of operating environments, including VM/CMS and MVS/TSO, and can interface with other data base management systems, such as IBM's IMS, DB2, SQL/DS and Cullinet Software, Inc.'s IDMS.

Previously, software developers using IBM 3270 terminals would have to copy data from the screen onto a piece of paper or make a hard copy to get a sense of work flow, said Robert B. Vonderhaar, senior product manager. Nomad Windows will free users and developers from the limitations of IBM 3270-type screens, which permit only 80 columns by 24 lines to be viewed at a time, by allowing for the creation of cascading and pop-up windows, he added.

"Things like pull-down windows are helpful because it is closer to the way we work," Vonderhaar said. "We don't always think sequentially; there are relationships between things that we need to readily see."

Using Nomad Windows, a user can simultaneously view several different aspects of a Nomad2 session; control shape, size, location, color and appearance of all windows; view report output in a full-screen mode; and review the history of previous commands and recall them into a command window for modification and reuse without an editor. Syntax errors and their location are displayed in a special message window, the firm said.

Patterned after IBM's Topview operating environment, Nomad Windows is the first mainframe programming language to use a windowing environment, Vonderhaar claimed. "We looked around and saw that no one else was doing it and felt there had to be a reason why. But we found none," he said.

Ted Jastrzembski, an analyst with International Data Corp. in Framingham, Mass., said that as far as he knows, Nomad2 is the only fourth-generation language with windowing capability.

"Whether it makes a difference or makes its architecture more palatable, I doubt it," he said. "But, it does make it easier to use. Nomad2 is one of the few mainframe fourth-generation language products with both data base management and decision support capabilities."

Nomad Windows will be incorporated into Version 400 of Nomad2, scheduled for release in January, Vonderhaar said.

It will be available free to current Nomad2 users.

INSIDE

NEW THIS WEEK

- Syncsort announces Release 3.0 of its Syncsort operating system
- For more on this and other new products, see pp. 81-92.

INSTANT ANALYSIS

"The tendency to base purchasing decisions on long-term, strategic benefits . . . is one of the most valuable keys in explaining recent developments in the computer software industry."

— *Software Currents* research report from Montgomery Securities, San Francisco, Calif.

Cobol-based system to prioritize factory work schedules

Module designed to monitor job activity

By Rosemary Hamilton

MOUNTAIN VIEW, Calif. — Consilium, Inc. has added an expert scheduling system to its manufacturing software product for Digital Equipment Corp. VAX and Microvax computers.

The Short Interval Scheduling (SIS) module is designed to work with Consilium's Comprehensive Online Manufacturing and Engineering System (Comets), which is used to track and record factory floor activity.

The SIS module, which the company said is an expert system written in Cobol, will automatically prioritize a factory's work schedule based on Comets data and a set of rules that are constructed by the user.

A critical factor with the SIS package is ongoing maintenance by the manufacturer that is using the module. Since the factory environment is continually changing, a system operator must keep SIS up to date by inputting data that would have an impact on the work schedule.

> ***SIS is based on a set of 39 factory conditions.***

For example, if a company's employees are out sick or a machine breaks down, the SIS package will require this information to order jobs in the most productive way, Consilium spokesmen said.

Currently in beta testing at Intel Corp. and DEC, the package is scheduled for availability in the second quarter of 1987, according to the vendor.

The SIS package, which costs $65,000 for a DEC Microvax and up to $100,000 for the high end of the VAX line, is based on a set of 39 factory conditions, such as machine status and number of jobs.

From these conditions, a user can construct rules with IF-THEN statements to govern his particular manufacturing process.

Job movement

A typical rule might be: If the number of jobs waiting for machine A is greater than 10 and the next job has a high-priority status, then move the next job to machine B.

Users can incorporate any combination of the 39 conditions, making rules as complex or as simple as necessary, spokesmen said.

According to the vendor, an SIS operator logs on to the scheduling module at the start of a workday and receives a list of jobs in order of priority.

Work-in-progress status

SIS has assembled this list by applying the user's rules to the factory data contained in the Comets package, which has records of scheduled work and also tracks the status of work in progress.

At that point, a user can input any new variables, such as those workers not available on that day.

The SIS module will then reorder the jobs if necessary.

Hung-up VM users offered instant logon

By Charles Babcock

ARLINGTON, Va. — Multiprocessor support for a software product that allows VM users who have been hung up by a system stall to log on again and resume work has been offerred by the VM Systems Group, Inc.

The support will be extended for V/Force running under VM/System Product or VM/High Performance Option on multiprocessors, attached processors and dyadic processors, according to VM Systems Group spokesmen.

V/Force removes users who are hung up from VM and allows them to log on again immediately. V/Force also attempts to free minidisks, tape drives, terminals or other devices in use by the hung-up users, spokesmen said.

Increased VM availability

"In complex or unstable environments, it may significantly improve VM availability," said Constance F. Mays, vice-president of marketing.

The enhanced processor support will be provided at no extra charge to current V/Force licensees.

It will have a price tag of $6,760 for purchase and will cost $2,400 for a one-year rental.

The new version will include full source code. The Arlington firm is a developer and marketer of system software for the IBM VM operating system.

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New Dimensions in Software Productivity.

Future stands on parallel processing, NSF predicts

By Ninamary Buba Maginnis

NEWTON, Mass. — The National Science Foundation (NSF) ranks parallel processing as its No. 1 research problem and claims the new hardware technology is the wave of the future.

"My belief is parallel processing [within] the next five to 10 years is going to be as important as computing itself," said C. Gordon Bell, NSF assistant director for computer and information science and engineering. "We have to break out of the sequential notion we've had."

Bell called on the Massachusetts Computer Software Council to write programs that work on parallel processors. "This is a software group. I'll tell you about the hardware because there is no software," he said.

A slight problem

"I'm convinced we have all the hardware. The slight problem is how do you program it? You have to train programmers how to program in parallel," continued Bell, who worked for Digital Equipment Corp. as a key designer for the VAX, Decsystem-20, Decsystem-10 and some PDP computers.

Parallel processing boosts performance and speed and improves fault tolerance and reliability, he explained.

"It's easy to get 100 million instructions per second today," Bell said. "Several machines provide processing power with this approach. If you start ganging these together — 100 to 1,000 — you can get 500 to 5,000 billion instructions per second. That's large amounts of processing power."

Environmental delegation

He shunned the idea that parallel processing should be delegated to academic and research environments. "I have personally worked on 10 computers that have been able to execute programs in parallel," said Bell, co-author of *Computer Structures.*

As artificial intelligence finds its way into the commercial realm, users will need parallel processors because expert systems slow machines down, Bell said. "You'll need parallel processing there because of the performance lost by going to that style of programming," he advised.

Parallel processing will be particularly useful for three-dimensional applications such as computer-aided engineering and manufacturing, he predicted. "I believe parallel processing is critical to computation in the next four decades," Bell said, founder of Encore Computer Corp. and the Dana Group.

Plea for a new structure

From page 19

implemented to increase the effectiveness of the systems development department.

This structure would entail the creation of an application development center. Its mission would be to accomplish the following:

- Reduce the applications backlog by using advanced tools and techniques.
- Develop a standardized, automated development technique.
- Educate and train the systems development department in the use of the tools and techniques acquired.

> ***Developers will ask the user community to take a more active role in the creation of business systems.***

An application development center is a physical entity within the systems development department that focuses on improving application development productivity and integrity.

It seeks to provide an optimum combination of the following:

- Support staff dedicated to automating the development process and assisting developers and their managers in using the development facilities efficiently.
- An operational environment that provides rapid, on-line access to development system tools.

The application development center would have the specific mission of improving application development productivity by introducing new tools and techniques into the development process and nurturing their use across the development project teams. Its implementation could yield substantial benefits. For instance, by increasing productivity of the systems development staff, more resources will be available to address the application backlog.

Developers will ask the user community to take a more active role in the creation of business systems. They will be expected to provide vehicles for validating user requirements and ways to permit early life-cycle testing of the application.

Developers will also have the chance to remove contention in the review and approval process through earlier testing, user feedback and a facility to permit an assessment of a new application's impact on the entire user environment.

The application development center could reduce the need for incurring the cost of packaged software and could also improve the utilization of existing tools, including information center-type systems such as Information Builders, Inc.'s Focus, the data dictionary and system design tools.

IBM controller debut predicted

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data base issues.

Inmon is a senior principal of American Management Systems, Inc. in Lakewood, Colo., a part-time consultant to Innovative Designs and former consultant for Coopers & Lybrand in Denver.

Inmon and Bird coauthored the 1986 Prentice Hall, Inc. book, *The Dynamics of Data Base*. Their report describes an intelligent disk controller as one with "a high degree of intelligence about what data is contained on the disks" the controller manages. While typical I/Os represent physical record processing, I/O with an intelligent processor represents "logical record processing."

The host processor running a data base management system issues requests for data in its own language, "not knowing or caring where the data is," and is thus "freed from much of the overhead associated with I/O," according to the book.

An additional and perhaps greater advantage, Inmon and Bird write, would be an intelligent disk controller's ability to optimize application performance by managing data storage. The controller, in effect, would be in charge of placing records on the disk independently of the host, based on established access patterns. It could also create and move subsets of data to new locations on a direct-access storage device to optimize access time for particular applications.

Inmon and Bird say support for an intelligent disk controller already exists in IBM's Media Manager, part of the company's Data Facility Product (DFP), which in turn serves as the disk storage controls of the MVS/XA operating system.

The Media Manager "enables the user to request data using a logical address rather than a physical address," Bird and Inmon write. If IBM does not intend to develop an intelligent disk controller, they ask, why did it develop the Media Manager rather than simply expanding its VSAM access method, IBM's flagship access method in the MVS world?

In addition, IBM switched its access method in Version 2 of IMS Fast Path from VSAM to the Media Manager. The reasons IBM gave for the change were that VSAM could have been enhanced to support larger data base block sizes and to utilize 31-bit addressing, Inmon and Bird write.

> ***"An intelligent disk controller is one with 'a high degree of intelligence about what data is contained on the disks.'***

The latest model of IBM's 3880 disk drive can act intelligently to manage virtual paging and swapping. Expanding the capabilities of such hardware and DFP software "will provide intelligent disk controller capabilities," they suggest.

The system for which IBM is likely to announce an intelligent disk controller is DB2, the pair write. "What better way to bring DB2 to the center stage of performance than to have it use the Media Manager and some new intelligent disk controller?" Inmon and Bird are reluctant to project how much of a performance improvement might result.

Given requests for randomly organized data, an intelligent disk controller may have little impact on performance. "But for long strings of sequential data that are organized together, stored together and accessed together, the intelligent disk controller may well provide a tremendous performance boost," they say.

IBM customers reacted with opposing comments when informed of the report. One said she was told by two high-level IBM spokesmen that IBM did not intend to off-load any DB2 function into hardware because it would become a limiting factor on changes in the software.

Another customer, the data base administrator for a large DB2 user in New York, said he had been informed that "there was no question about it. IBM is moving in the direction" outlined by the report.

MDBS moves data base to DEC VAX

LAFAYETTE, Ind. — Micro Data Base Systems, Inc. has released a version of its data base management system MDBS III for the Digital Equipment Corp. VAX line of minicomputers.

MDBS III is said to allow real-world modeling of data relationships, with facilities for data security and performance tuning, company spokesmen said.

In addition to its data base management system, Micro Data Base Systems is the creator of such microcomputer software as Knowledgeman/2, a relational DBMS with decision support tools, and Guru, an artificial intelligence system for business.

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Publishers await system

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rently running in proven operations.

Earlier this year, Composition Systems was purchased by Crosfield Electronics, a UK firm, and Stock left to start his own company, Artificial Intelligence Technologies, Inc. Crosfield retains him as Expert Publishing Systems' program director.

People like Don McGhan, production director for the Newspaper Printing Co. in Nashville, Tenn., are keeping close watch on the beta tests. McGhan's firm publishes both the *Nashville Banner* and the *Tennessee-an*. "It gives me cold chills to think of the possibilities. It sounds too good to be true.

"Michael Stock is a very unique individual," McGhan continues. "From what I understand, he sleeps with his keyboard on his lap."

'A brilliant man'

Mel Kestenbaum, information systems director of the *Bergen Record* in Bergen County, N.J., says, "Michael Stock is a brilliant man, but . . . for the moment, we have not jumped on the bandwagon.

"The thing intriguing about [Stock's pagination system] is it manages lots of diverse real-time information and supposedly develops optimum courses of action quicker than people can," Kestenbaum observes.

Toronto Sun's Guy Huntingford, manager of business systems, agrees. "You can redummy the paper pretty close to deadline, which you can't do now," he says.

But Huntingford, too, is banking on Stock. "The guy's just a whirlwind. From what I understand, he sleeps very little and is just a bundle of energy. He's somebody who is able to put together a really complex system, but also smart enough to put it together from a business point of view," he says.

Process control

Although Stock wants to see the pagination system succeed, he is now more interested in process control, a subject he studied in academia and is pursuing commercially.

"I think the technology we're working on can fundamentally change the industrial fabric of America, and I would like to be a part of that change," Stock says.

"I'm extraordinarily narrow in my real interests," he adds. "There could be a war in Europe, and I wouldn't know about it."

At 35, Stock is no newcomer to technology. As a 10-year-old in New York City, he found an unclaimed Fortran manual on a train, read it and became a programmer by borrowing computer time from area schools and businesses. "When I was 12 years old I began reading about cybernetics," he says.

Mastering several disciplines

The young Stock realized he should master several disciplines, including computer science, control engineering, operation research, applied mathematics and expert systems. He outlined a study program that kept him in full-time post-secondary programs from 1969 to 1982, collecting degrees from the Polytechnic Institute of New York in Brooklyn and Harvard University.

While in school, Stock worked as a process control consultant for various industries. He claims his background gives him insight into expert systems problems. "The most important attribute I have is synthesis," he says.

So when Stock designed Composition Systems' Expert Publishing Systems, he called on any languages he needed — "the right tool for the right job" as he puts it — incorporating several into his system.

Stock rarely relaxes from his work, and when he marries his fiancee, Rose Gafkowski, on Nov. 22, they will take a two-day respite on the New Jersey shore before he returns to his labors.

"I'm biologically ill-suited to relaxing. Work is relaxing to me," he says.

Expert systems proposals

His enthusiasm and energy caught the attention of firms like Combustion Engineering, Inc. and Stone & Webster, Inc., which are closely examining Stock's expert process control systems proposals to see if his applications can make their plants safer, more efficient and more profitable.

Alan Krigman, Combustion Engineering's director of marketing for engineered systems and control, says, "We moderated Mike's anxiety to jump three giant steps ahead by pointing out that the only way to make progress is one step at a time. And, in his case, Mike moderates us from doing just traditional concepts. A company that doesn't open itself up to this [new technology] will be left behind."

Stock is well-known in DEC artificial intelligence circles and is a contributing editor to *Digital News*, a Boston-based weekly newspaper dedicated to reporting on VAX computing. He has adopted as an inference engine the Los Angeles-based Inference Corporation's Automated Reasoning Tool, commonly known as ART.

"It's got some features that no current available methods of tuning offer," Combustion Engineering's Krigman observes.

His firm wants to use expert technology to tune equipment that regulates temperature and other variable factors in manufacturing processes. "For one thing, it can look at several loops at the same time. And that's important because the loops may be interacting. . . . No other system can do that," he says.

COMMUNICATIONS

DATA STREAM
Elisabeth Horwitt

Protocol issue again in arena

Once again, the Federal Communications Commission is mulling over the question of how easy it should make it for the divested Bell operating companies and AT&T to offer protocol processing on their networks.

The basic issue, which should be decided early in 1987, according to an FCC spokesman, is whether the protocol conversion should continue to be treated as an enhanced service or be treated as a basic service that divested carriers can offer in conjunction with other regulated offerings, such as packet switching.

Predictably, AT&T and the divested Bell operating companies are on one side and their competitors in the value-added network arena are on the other — with users in the middle, trying to determine the alternatives' long-term consequences for their companies' communications networks.

There is a good chance that the outcome will have a major impact on communications managers' lives during the next decade, because it could set a precedent for the way the divested carriers compete in other enhanced service markets.

"The real question is, How awkward will the FCC make it for the operating companies to offer any enhanced service?" says Joseph Healy, a group manager at consulting firm Network Strategics, Inc. in Fairfax, Va. "AT&T and the rest hope that the protocol regulation will set a precedent for their offering D Channel ISDN services in the future."

See **PROTOCOL** page 31

Horwitt is Computerworld's *senior editor, communications.*

Modems vie in standards war

Latest modem introductions highlight standards schism

By Ninamary Buba Maginnis and Elisabeth Horwitt

SUNRISE, Fla. — Two recent product announcements have further defined an emerging schism between two versions of the CCITT V.32 standard for dial-up 9.6K bit/sec. modems.

Racal-Milgo, Inc. recently announced the RM-9632, a synchronous dial-up modem that offers symmetrical or full-duplex 9.6K bit/sec. transmission over dial-up lines. And last week, U.S. Robotics, Inc. unveiled the Courier HST, an asymmetrical V.32 modem that concurrently supports 9.6K bit/sec. transmission in one direction and 300 bit/sec. in the other.

U.S. Robotics is trying to convince the industry to adopt as a standard V.32-based coding for asymmetrical 9.6K bit/sec. dial-up communications. "The V.32 trellis coding provides far lower error rates than the existing V.29 standard and also allows for migration to higher data rates," said Casey Cowell, the company's president.

So far, the company has gained one supporter — Concord Data Systems, Inc., which is already marketing a symmetrical 9.6K bit/sec. dial-up modem and plans to develop an asymmetrical 9.6K bit/sec. modem "as soon as the standards firm up," according to Concord Data engineer Graham Davies.

Other modem vendors are waiting in the wings while the proposed standard is considered by the U.S. Modem Working Party and the CCITT, said Dale Walsh, U.S. Robotics' vice-president of engineering. Approval of the standard is at least 16 months away, he added.

"There is a market need for symmetrical 9.6K bit/sec. transmission," Davies said. He cited terminal-to-host applications, in which a 300 bit/sec. channel can easily keep up with a user keying in commands, while the 9.6K bit/sec. host-to-terminal channel can be used to refresh the

See **RACAL** page 29

Avanti adds to T1 net options

By Elisabeth Horwitt

NEWPORT, R.I. — An enhancement to Avanti, Inc.'s Ultramux line of T1 switches, unveiled last week, enables users to route individual 64K bit/sec. DS0 channels over either private leased-line or public network service connections, the company claimed. But the capability may have limited application until network service vendors introduce equivalent functionality in their own offerings, according to Richard Kuehn, president of Cleveland-based consulting firm RAK Associates.

Called unrestricted individual DS0 routing, the enhancement allows users to divide a 1.5M bit/sec. T1 link into 24 64K bit/sec. channels and configure each channel differently. Allocation of private leased lines is performed through the Ul-

See **SWITCHES** page 30

AST Research links PCs to IBM minis via latest software

By Elisabeth Horwitt

IRVINE, Calif. — Two products recently introduced by AST Research, Inc. combine new software with existing hardware products to support multiple sessions between IBM Personal Computers and IBM System/34, 36 and 38 minicomputers.

The 5250/Gateway combines the existing 5251/11 Plus terminal emulation card with software that distributes printer and terminal emulation capabilities to multiple IBM PCs on a local-area network (LAN). This eliminates the need to equip each PC with a 5251/11 Plus card, AST said.

The Gateway can handle up to seven concurrent sessions between PCs on the LAN and a minicomputer host. One net-

See **AST** page 30

INSIDE

NEW THIS WEEK

- Intel and Flexlink offer software for connecting IBM mainframes with DEC minis
- For more on this and other new products, see pp. 81-92.

INSTANT ANALYSIS

"Multiuser systems will become obsolete, while network servers — file, bridge and artificial intelligence servers and data base machines — are on the rise."

— William Zachmann, vice-president, International Data Corp.

Fox Photo employs ordinary phone lines for data transmission

Networking tool lowers communications budget

By Donna Raimondi

A communications package designed to meet Eastman Kodak Co.'s networking needs has helped a Sunbelt photofinishing company economize on its communications budget by sending vital data over regular telephone lines.

Fox Photo, Inc., an 81-year-old photofinishing company, chose Kodak subsidiary Eastman Technology, Inc.'s Syncra to manage a $2 million network that includes the headquarters' VAX 8200 and Microvax IIs at 20 main processing plants.

"All of our information — like price changes — originates here," at headquarters in San Antonio, says Thomas McEvoy, senior vice-president of management information services at Fox's main office. "All of our financial reporting and information back to our accounts is reported through here, so quality of information is critical."

Fox's NCR Corp. 8595 mainframe at headquarters performs data base management functions and financial applications for the entire company. Information is fed into the mainframe via the VAX 8200 minicomputer, which, in turn, receives its data from the 20 plants' Microvax IIs.

Syncra manages all data tracking and reporting on the network. "When you are dealing with a network the size of ours, it is very important to know the next morning who you got through to that night without having to go through manual checklists," McEvoy says.

Syncra compresses data by about 52% before transmitting it over dial-up telephone lines, McEvoy says. This enables Fox to realize an effective communications rate of 19.2K bit/sec. over the Universal Data Systems, Inc. Model 1201 9.6K bit/sec. modems.

The software encrypts data while compressing it, and it can only be read by another Syncra software package, McEvoy says. "I'm not sure it's government-level security, but it is very secure communications because of the encryption," he maintains.

The compression feature was one of the biggest selling points for Fox, McEvoy says. The company operates with a data communications budget of approximately $25,000 per month, and the business expands constantly. "We need to be as efficient as possible in our data communications, not just for the cost factors but because corporate management is looking for information the next morning," he maintains.

The eight-year-old Data General Corp. Nova system and the communications software developed in-house that were used before installing the VAX/Syncra system took nine hours, at 4.8K bit/sec., to transmit data from the 20 plants.

The system also performs network management. For instance, if there are bad telephone lines — a situation that is all too common these days, according to McEvoy — the communications software will automatically restart the transmission at the point of failure.

Automatic file distribution

Syncra can be programmed to collect and distribute files automatically, McEvoy says. "You set up a calendar. The Syncra goes through, dials each location, goes after the files that are there, drops the files you are sending and continues on to the next location," he adds. The software will return automatically up to three times to retry bad lines.

"Not to beat on AT&T, but the quality of the phone lines is sometimes poor," McEvoy says. A recent day's transmissions were marred by 19 failures going to one line. "We are on dial-up lines, but will have to go to leased lines in two out of our 20 plants because of quality problems." The leased lines will go to two of the biggest plants because late information from them can adversely affect the validity of next-day reports.

"Syncra compensates for poor lines. It automatically drops back its transmission speeds and it has a tremendous error-checking protocol. We have never gotten a bad file in here, and we have been operating with the package since May 1," McEvoy says.

With the VAX/Syncra combination, McEvoy says, the plants transmit in five hours. "At one of our locations with bad telephone lines, it would not be uncommon before to get through 90% of the file three times and lose it and have to restart. So now, it will restart at that 90% point and then we are finished."

Fox also lost data during transmissions because its old communications package did not include error-checking facilities. "We would lose a bit here and there, and then the file would not process in the mainframe," McEvoy says. "We have yet to experience that with Syncra."

Fox is currently beta testing PC Syncra, an IBM Personal Computer-based version of Syncra not yet commercially available. If all goes well, the photofinishing company will use the software package to tie its 202 IBM Personal Computer XT-based minilabs into the VAX system, McEvoy says.

Racal joins CCITT market

From page 27

user's screen and download data to an IBM Personal Computer in terminal emulation mode. "But full duplex is needed for true bidirectional communications, such as a financial company's national network or any application when you are switching messages or multiplexing data from many sources," Davies added.

Cowell agreed that asymmetrical and symmetrical 9.6K bit/sec. dial-up modem standards should not be rivals. He was quick to point out, however, that his company's product could handle "most communications applications, except for multidrop installations."

The Courier HST's flow control capabilities allow it to switch the 9.6K bit/sec. channel from sending to receiving mode, depending on which system is doing the heavy transmitting, he noted.

A major advantage of the Courier HST is its $995 price tag, which is approximately $100 more than a comparable 2.4K bit/sec. modem from Hayes Microcomputer Products, Inc., according to Cowell. In contrast, symmetrical V.32-compatible modems offered by Concord Data Systems, British Telecom International, Codex Corp. and now Racal-Milgo cost approximately $3,500.

Sophisticated technology

Symmetrical V.32 products are costly because of the need for sophisticated technology, such as echo cancellation, which enables the same telephone line bandwidth to support bidirectional 9.6K bit/sec. channels, Cowell said. He further claimed that echo cancellation sometimes fails to fulfill its function of eliminating signal interference between overlapping channels. This can result in unacceptable error rates, especially over long-distance connections, he noted.

Asymmetrical V.32 modems do not need echo cancellation because a telephone line can concurrently support one high-speed and one low-speed channel without overlap, according to Cowell.

The cost of symmetrical modems is "prohibitive on a one-to-one basis, for sure," noted Barry Gilbert, vice-president of Market Information Center in Marlboro, Mass. "You'll find the product will be used in modem-pooled environments running off local-area networks. Only a couple will be on the network — depending on network costs."

When Rockwell International Corp. manufactures in quantity the high-speed chip for V.32 9.6K bit/sec. dial-up modems in 1987, OEMs will create a competitive market, and the prices will drop, said Lynn Davis, an analyst at International Data Corp., a Framingham, Mass., research firm.

In addition to 9.6K bit/sec. rates, the Courier HST supports 1,200 bit/sec. and 2,400 bit/sec. transmission with Microcom Network Protocol error-correction protocols as a standard feature, U.S. Robotics said. The product will ship in December.

The RM-9632 can operate at 9.6K bit/sec. and at 4.8K bit/sec. over two-wire dial-up or two-wire and four-wire leased-line circuits. It is available now.

Comsat claims technique extends satellite life

By Mitch Betts

WASHINGTON, D.C. — Communications Satellite Corp. (Comsat) recently announced it has developed a method of extending the life of communications satellites in geosynchronous orbit, a cost-cutting move that is expected to reduce transponder rates for customers in the future.

Called the Comsat Maneuver, the control technique extends the life of the satellite by at least 50% by saving the fuel used to keep the satellite and its footprint from drifting. The Comsat Maneuver allows the satellite to drift but subtly tilts the satellite so that its footprint remains stationary on the ground.

Ground antennae must be programmed to track the Comsat Maneuver. Comsat spokesmen said some earth stations will need little or no modification but that nonsteerable earth stations will require an investment of about $15,000 for modifications to track the satellite.

Comsat officials did not disclose the expected rate reductions for users, but predicted that users can quickly recoup the costs of modifying their nonsteerable earth stations.

George R. Dellinger, telecommunications analyst for Washington Analysis Corp., said that by stretching the life span of a satellite from seven to 10 years, the technique cuts depreciation costs and thus will lower transponder rates for voice, data and video communications users. He said the rate reductions will make satellites more competitive with trans-Atlantic fiber-optic cables in the 1990s.

Comsat has applied for a patent on the process and will share the technique with the International Telecommunications Satellite Organization.

William L. Mayo, president of Comsat General Corp., acknowledged that Comsat developed the cost-cutting technique to meet the competitive challenge of fiber optics.

Because satellites will need only one-tenth the amount of fuel previously required, designers can add extra features to new satellites, Mayo added.

Switches offer T1 net option

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tramux switch on customer premises; allocation of channels over AT&T Accunet 1.5 services is performed through Customer Controlled Reconfiguration, Avanti said.

One T1 line can thus support connections to a mixture of leased-line connections and AT&T services, such as Accunet, Megacom and WATS, said Avanti Vice-President of Marketing George Kushin.

Avanti was able to offer this capability because the Ultramux T1 switch has high-level compatibility with AT&T's Digital Access Cross-Connect System (DACS), a central-office facility that routes user transmissions among AT&T's services, Kushin said. "Many other T1 switch vendors just offer gateways to DACS, which prevents them from offering intelligent routing at the DS0 level."

Ready for ONA

Unrestricted individual DS0 routing positions Avanti users to take advantage of the Federal Communications Commission's Open Network Architecture (ONA) plan, scheduled for implementation by 1988, Kushin said. "Ideally, under ONA you will have a standard interface for different vendors' services." Right now, most carriers use AT&T's DACS protocols, Kushin said, "because that's where the equipment vendors are."

AccordingtoKuehn,however,users cannot yet take full advantage of Ultramux's DS0-level routing because interexchange carriers such as AT&T and MCI Communications Corp. "are not grabbing on to the idea of increasing the number of subchannels a T1 link can support."

Kuehn's own firm, RAK Associates, uses a mixture of Dataphone Digital Services, WATS and 56K bit/sec. leased-line connections, with Megacom on order, Kuehn said. "But AT&T won't let us multiplex different T1 subchannels into different services."

"It's true that you can't mix and match our different services," admitted AT&T spokesman James Byrnes. "Today we are limited by the tariff situation dictating that when a customer decides on T1 private line access to one of our services, he must allocate the whole T1 line." The next upgrade of AT&T's 4ESS central office switch software "is likely to include dynamic allocation enabling users to channel T1 bandwidth to different services," Byrnes added.

Mixing and matching services

AT&T plans to allow the mixing and matching of its services by the end of second-quarter 1987, according to Kuehn, "but it will still be in 64K bit/sec. increments."

Kuehn also expressed doubts as to whether the same switch protocols will easily link to the full range of carriers' enhanced services.

RAK found, for example, that its Timeplex, Inc. T1 switch will interface with AT&T's M24 service but not with the M44 service, Kuehn said.

Timeplex's Link/2 switch is scheduled to be tested at AT&T for DACS compatibility at the DS0 level later this month, the company said.

AST Research ties PCs, IBM minis

From page 27

work can support up to three 5250/Gateway systems, enabling PC users to set up concurrent terminal or printer sessions on more than one host.

Remote connection support

Remote connections between a Gateway and host system are made via standard twinaxial cable; remote connections support IBM's Systems Network Architecture (SNA)/Synchronous Data Link Control (SDLC) protocols.

The AST-5250/Gateway will run on AST Star Systems, AST-Resource Sharing Network or other Netbios networks.

The Gateway is priced at $1,995 and is scheduled to ship in December, according to the vendor.

AST also announced AST-5250 Remote Cluster, which converts an IBM PC into a master station performing 5250 printer and terminal emulation for up to four PCs or Digital Equipment Corp. VT100-type terminals. The 5251/12 board's printer and terminal emulation capabilities are distributed to the slave workstations via the four-port Asynchronous Adapter, another existing product.

Emulation board elimination

Like the 5250/Gateway, the Remote Cluster Master PC eliminates the need for multiple terminal emulation boards and for an IBM remote controller.

The product establishes a terminal-to-host connection with an IBM minicomputer over a remote link supporting SNA/SDLC. Workstations can be linked to the Master PC over RS-232 cable or a dial-up modem connection at rates of up to 19.2K bit/sec. Users can hot-key between terminal and DOS sessions.

Priced at $1,995, the Remote Cluster will be available in December. Current users of the AST 5251/12 emulation card can upgrade to the product, AST said.

AST's standard file transfer package is supplied with both the Gateway and the Cluster Controller at no extra charge. Both products support, through IBM's Application Program Interface, the IBM PC/Support/36/38 software package.

Protocol issue again in arena

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This is likely to be the case, according to Healy, "because the FCC would like to develop a consistent regulatory stance, to avoid having to go through a Computer Inquiry IV." Carriers are proposing to use the Integrated Services Digital Network D channel as a conduit for a wide range of enhanced services, including call accounting, precall screening and bandwidth reallocation.

"AT&T and the divested operating companies want protocol processing to become regulated so that they can embed conversion in their basic packet-switching services," says Richard Fazzone, who represents General Electric Corp. at the International Communications Association, a national users group.

Equal footing

Telecommunications managers, he explains, think protocol conversion, along with other enhanced services, should remain deregulated in order to put the divested Bell operating companies and AT&T on the same footing with their competitors when it comes to obtaining basic transmission services that underlie protocol conversion.

The divested carriers strongly disagree with this premise. In its comments filed with the FCC, AT&T argues that being forced to offer protocol conversion as a stand-alone service puts its Accunet service at an unfair disadvantage in the competitive packet-switching market.

The vendor currently offers Accunet as a vanilla transmission service, while competitors like Telenet Communications Corp. provide value-added services, such as electronic mail and conversion to IBM Synchronous Data Link Control and 3270 protocols, as part of their packet-switching product lines. "That service might finally take off if we could offer protocol processing as an adjunct," says Ted Fletcher, AT&T federal regulations district manager.

Under Computer Inquiry III regulations, divested carriers can provide basic and enhanced services on the same facilities — provided that they give their competitors in the enhanced services market the same quality and cost level of access to the basic transmission services that support their own enhanced services.

This comparably efficient interconnect (CEI) ruling is still a matter of hot industry debate. Users and value-added network vendors claim it is necessary to preserve competition, while the divested carriers argue that the ruling puts them at an unfair disadvantage.

For example, New York Telephone Co. is currently embroiled with the FCC over whether its proposed packet-switching service, Infopath, comes under CEI. Approximately a year ago, the divested Bell operating company applied for an FCC waiver that would permit it to offer asynchronous-to-X.25 protocol conversion services with Infopath.

Under the then-applicable Computer Inquiry II ruling, New York Telephone first had to provide its competitors with "comparable access" to the data-over-voice transmission services that its customers would use to access Infopath. The firm agreed to provide, at competitors' expense, central office equipment that would link their services to its data-over-voice offerings.

Rules changed

But before the FCC could approve New York Telephone's tariff, Computer Inquiry II comparable access gave way to Computer Inquiry III and CEI rules, which require that a divested carrier and competitors share the cost of concentration equipment needed to provide comparable access.

New York Telephone has "accepted the fact that we must provide competitors with access to basic service elements such as data over voice — we can't fight that," says Augie Trinchese, manager of technical policy development at regional holding company Nynex Corp.

Nynex would prefer, however, that protocol conversion was a regulated service "that competitors could choose to subscribe or not subscribe to," he adds. "We object to footing the bill for providing services like data over voice to our competitors." Trinchese says the FCC is currently reconsidering this aspect of CEI.

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MICROCOMPUTERS

MICRO BITS
William Zachmann

All Aboard for PC power

There seems to be some fundamental law of nature involved with personal computer expansion slots: No matter how many you've got, there are never enough. Fortunately, new semiconductor chips and improved semiconductor packaging technology are making it possible to put more capability into single boards.

Ideassociates, Inc.'s All Aboard is a good example. Its maximum configuration offers an enhanced graphics adapter, graphics controller, serial and parallel ports, a system clock, a hard disk controller and 2M bytes of expanded memory conforming to the Lotus/Intel/Microsoft expanded memory specification. All of this fits into a single IBM Personal Computer XT long slot.

Ideassociates, based in Billerica, Mass., is a real up-and-comer in the expansion board business and one of the first to bet on surface-mount technology for future products. This technique, which will certainly become the standard in the future, involves directly mounting miniaturized semiconductor chips on the printed-circuit board. This makes it possible to pack much more function into a given amount of real estate on the board than was possible with the older dual in-line package (DIP) mounting.

With the DIP mount, familiar to anyone who has ever inserted additional memory chips on a board, a plastic chip holder is soldered onto the printed-circuit board. Semiconductor chips are

See **ALL** page 38

Zachmann is vice-president of research at International Data Corp.

Lotus TAC reworks Ilink with focus on applications

By Merv Adrian

CAMBRIDGE, Mass. — On July 9, 1986, Lotus Development Corp. introduced The Application Connection (TAC) at the PC Expo in New York. By late in August, the product began shipping, and there was already a backlog.

In a recent interview, TAC product manager Mussie Shore gave some insight into Lotus's perception of the product's place in the market. Shore also allowed the opportunity to test one of the mainframe interfaces provided by Lotus.

Lotus's entry into this market may serve to validate it in the eyes of corporate users in the same way IBM's entry into market segments often does.

But possibly the most significant contribution Lotus has made here is a redefinition of the market through its focus on applications. Lotus's point with the name and the marketing thrust of their product is that, while the transfer and communication technology is important, it is the applications that should drive the thinking about the product. This reflects a growing maturity in the micro-to-mainframe market: It implies a reliance on, rather than a fascination with, the technology and a sense that it is time to get on with the business of using it.

TAC is Lotus's reissue of an existing micro-to-mainframe product called Ilink. There are four components to TAC: the mainframe driver, the mainframe interface modules, the micro driver and the micro interface modules. "Our goals for the product on the micro side included integrating it into our own products," Shore says, "but we soon found that our users expected much more than that as we researched their needs. Recognizing that there are many corporate standards led us to a strategy of modularization."

The modules presently available on the

See **LOTUS** page 39

NEW THIS WEEK

- Texas Instruments expands its Pro-CAD 286 line
- For more on this and other new products, see pp. 81-92.

INSTANT ANALYSIS

"I can see desktop publishing beginning to replace word processing systems. You can hardly see a new editor today that doesn't talk picas or support some basic composition."

— Ronald Eich, director of development of IBM Publishing Systems Business Unit, at Seybold Conference on Desktop Publishing.

Micro prices offered on disk

Rate index data base lets PC do the walking

By Douglas Barney

GERMANTOWN, Tenn. — Looking for the best price for personal computers and components often entails a tedious process of scouring magazine ads, calling vendors and haggling with computer dealers.

IBC/Innovention, Inc. recently announced a $10 product designed to shorten and simplify that process. The Computer Price Index Diskette contains pricing information on a wide variety of personal computers, modems, printers, diskettes and monitors. The disk provides the lowest price unit as well as the name and telephone number of the product's source.

"Our intent is to make it easy for the buyer to find the best price in the country," said John C. Simmons, manager of IBC/Innovention.

As a computer consulting firm, IBC/Innovention used to charge clients consulting fees for poring through magazines to get the best prices on products. "We would be trying to find printers for their workstations or PCs and spent literally weeks trying to locate the best price," Simmons said.

This system clearly lacked efficiency. "It struck me one day we were dealing with a computer age, and we are not using computers to locate the best price."

The firm first established an on-line data base of prices. "We encouraged dealers to bid against each other," Simmons recalled. "When things got slow we called the second best price to tell them what the best price was and encourge them to beat it."

See **MICRO** page 38

Vendor says XT compatible runs 15 times faster than AT

Aims system at CAD, technical operations

By David Bright

NORCROSS, Ga.— At Comdex/Fall '86 this week in Las Vegas, Datavue Technical Systems, a newly formed division of Datavue Corp. — sister company to Quadram Corp.— will introduce an IBM Personal Computer XT compatible that it claims runs 15 times faster than an IBM PC AT.

The new class of souped-up AT-compatibles built around Intel Corp.'s powerful 80386 microprocessor generally run twice as fast as the PC AT.

The Super Micro 150 system employs a proprietary two-board CPU hooked to a PC XT-compatible system used for I/O control. List prices for the package range from $12,000 to $15,000.

The system is being targeted at computer-aided design, manufacturing and engineering (CAD/CAM/CAE) and other computer-intensive applications, such as animation and large spreadsheets. It will be sold to value-added resellers, OEMs and, on a limited basis, to end users.

While many vendors of 80386-based systems are hoping for new operating systems and applications to increase their machines' appeal, Datavue Technical Systems is concentrating on the existing base of IBM PC software. The system will run existing applications "a lot faster and will give them a much longer life" without users "having to scurry into 386-compatible-type stuff," says general manager Joe Maroney.

For example, an advertising agency that now requires 900 hours on an AT to create a 30-second animated commercial will be able to do the same job in 60 hours with a Super Micro 150, Maroney claims.

The system can reportedly be adapted to accommodate several standard buses in addition to the PC's bus, allowing it to be optimized for custom applications.

When used in a PC environment, the processor box containing the two-board CPU connects to the PC XT-compatible unit's Intel 8087 socket. The XT-compatible system sits atop the processor box.

The Super Micro 150 system comes with 256K bytes of random-access memory (RAM), a 360K-byte floppy disk drive, a 10M-byte hard disk drive, an AT-style keyboard, a serial port and a parallel port. Also standard are a 190W power supply and nine PC XT-compatible expansion slots.

The processor's memory can be expanded to 2.5M bytes. Other options include a 20M-byte or 72M-byte hard disk drive, a 20M-byte or 60M-byte streaming tape backup drive and a 13-in. enhanced graphics adapter color monitor with 640- by 350-pixel resolution.

Datavue Technical Systems has also announced a lower end XT-compatible system that reportedly outperforms an AT system. According to Datavue, the Series 30 system, which is used as the I/O controller for the Super Micro 150, is ideal for CAD/CAE and for other design applications.

Priced at $2,395, the basic system comes with 512K bytes of RAM, an IBM AT-style keyboard, a 150W power supply and eight slots.

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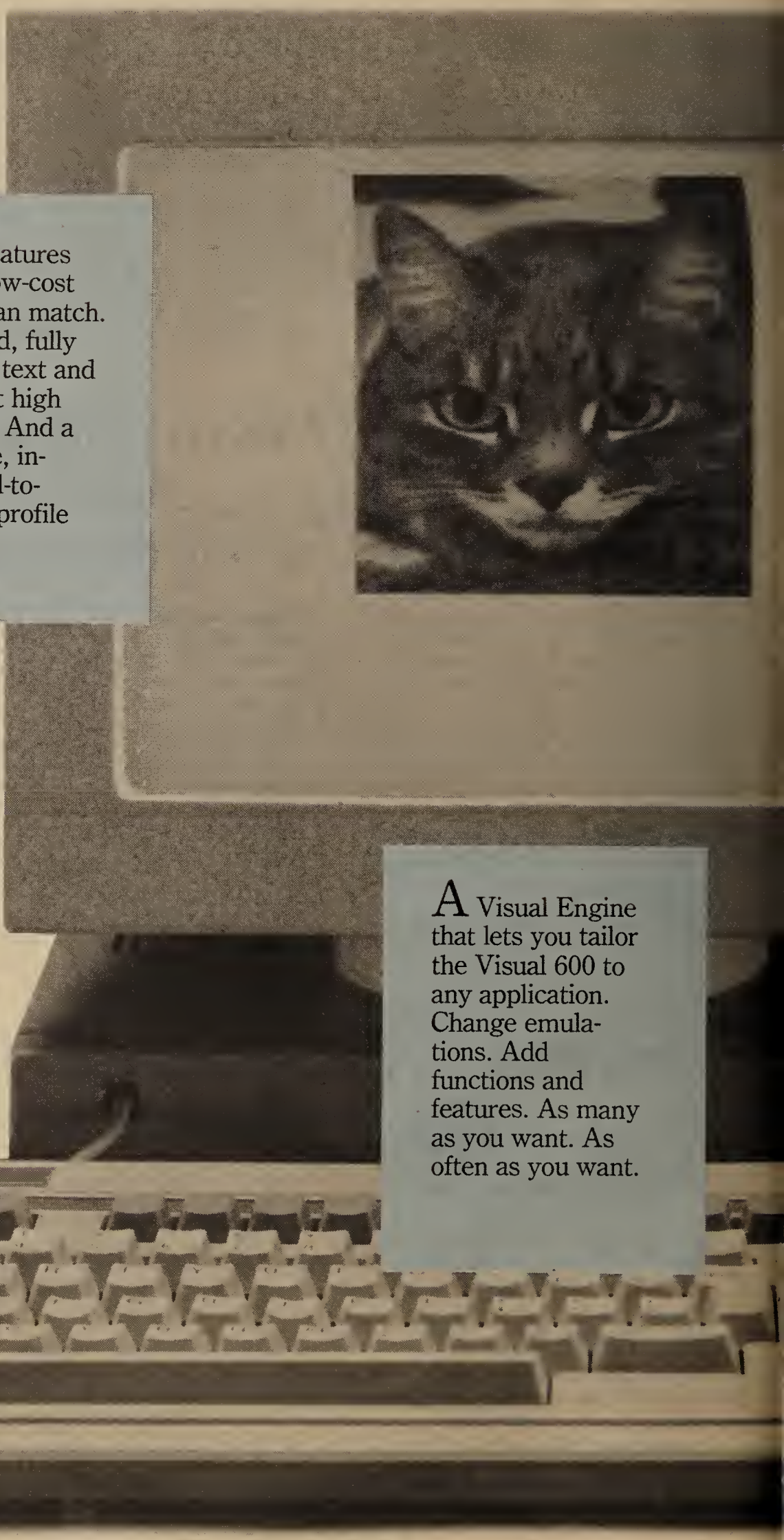

PATENTS PENDING

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emulations. Even include non-standard connectors and additional communication ports.

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But, that's not all. With the Visual 600 series' bit-mapped video capability, Tektronix 4010/4014 and Visual 500 graphic applications are supported. Two pages of graphics memory allows one graphics image to be viewed while the other image is being drawn.

But that's still not all. The Visual 600 series also features an auxiliary port and local support of both conventional and laser printers, data tablets, mice and plotters.

FEATURE	VISUAL 600	FALCO 500	WYSE WY-60
Page White Phosphor:	Yes	Yes	Yes
Screen Refresh Rate:	70 Hz	60 Hz	60 Hz
Overscanned Video:	Yes	No	No
Character Size:	11 × 14	8 × 12	7 × 12
Processor Type:	16-bit	8-bit	8-bit
Integrated Text and Graphics:	Yes	No	No
List Price:	$695	$795	$699

Desktop accessories include pop-up calendar, calculator, alarm clock and windows.

Initially, the Visual 600 series may be purchased in one of five off-the-shelf models. Versions available include the Visual 601, a full featured ASCII terminal; the Visual 602, a full featured ANSI terminal; the Visual 603, a VT220 Compatible; the Visual 604, a PC display terminal; and the Visual 630, a business graphics terminal.

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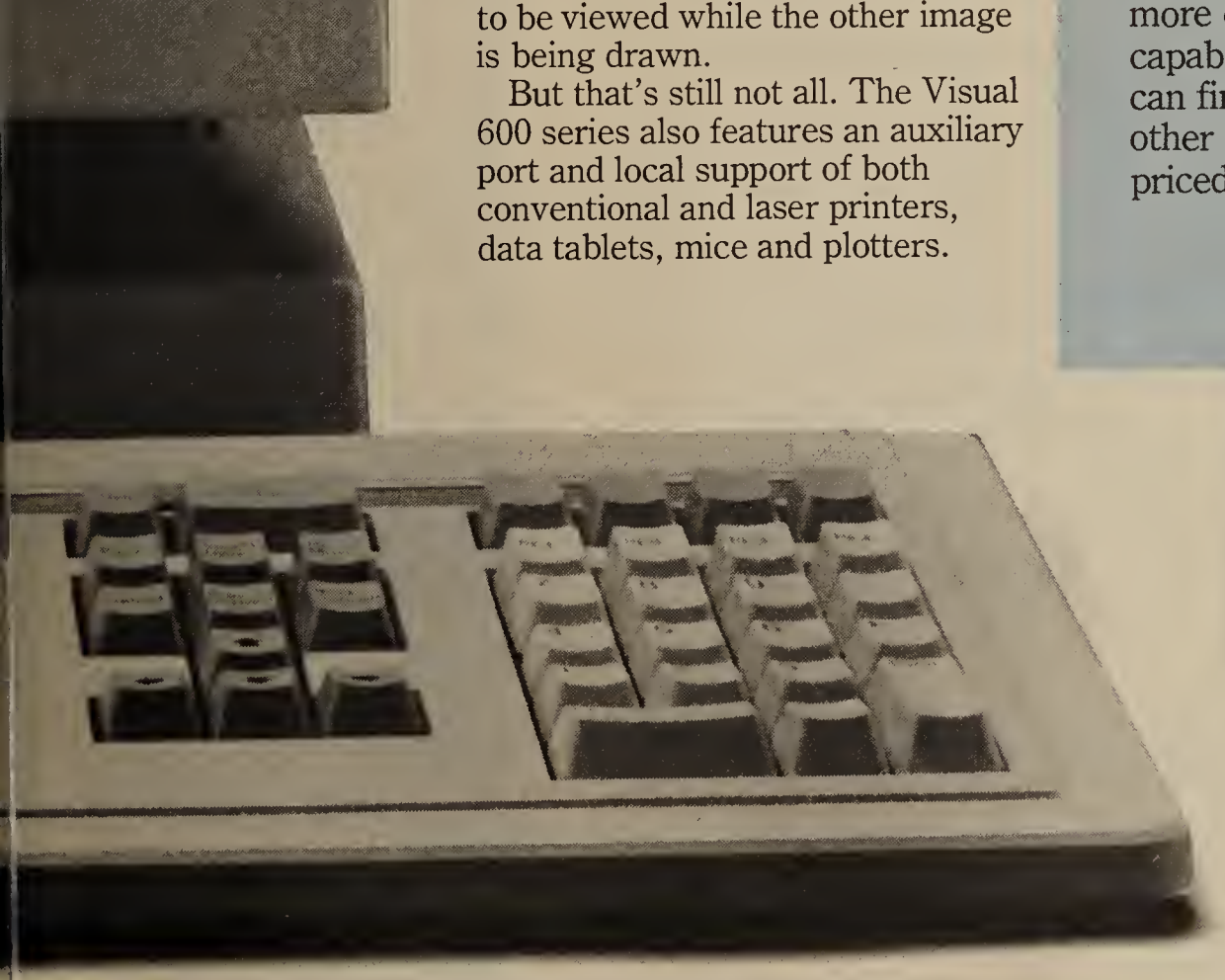

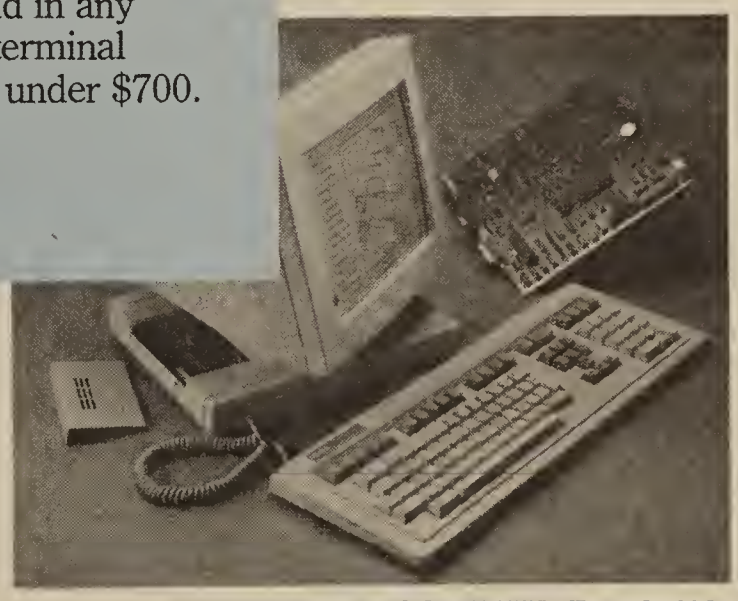

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All Aboard for PC power

From page 35

packaged in plastic carriers with small metal leads running down each edge. These are physically inserted into the holder.

With surface-mount technology, the silicon chip is mounted in a smaller plastic chip holder with electrical connection points at the edge. These are directly soldered to connections on the printed-circuit board.

Custom chips that combine the function of multiple standard chips aid in allowing much more function to be put into a given printed-circuit board area. All Aboard is available in several alternate configurations. With monochrome and standard IBM Color Graphics Adapter graphics and without expanded memory, it lists at $545.

With expanded memory capability but without the memory chips, it costs $745. The IBM Enhanced Graphics Adapter-compatible version is $795 without memory and $995 with memory.

Up to 2M bytes of memory may be installed by the user in the versions with expanded memory. This memory goes on a nicely designed daughterboard that attaches to the main expansion board with three screws. Even with the daughterboard mounted, the whole unit still fits into a single expansion slot.

Installation standard

Physical installation is fairly standard. There are five three-pin jumpers that must be correctly set to indicate the adapter mode and monitor used. The parallel port and display interface are on the back of the board.

The serial port attaches with a ribbon cable and will normally be mounted on the back of another slot — though if you are out of space and not too afraid of the Federal Communications Commission, you can just slip it out between the chassis and the cover of the system unit.

There is also a composite video connector, if you are using a video monitor, that pins into the board and feeds through a small slot at the end to an RCA Corp. jack for the video connection.

Software well designed

The installation software is well designed and straightforward. The SETALL utility starts by checking the way the system is configured and presenting it to the user for confirmation.

If there is a new unformatted hard disk connected to the All Aboard disk controller, it offers to format it, then makes the disk bootable.

The function of the All Aboard serial and parallel ports, the operation of the display and the clock/calendar are verified, and the expanded memory, optional random-access memory disks and spooler are installed if desired.

Before completion, a final verification of configuration and settings is offered to the user for further modification as needed.

All things considered, All Aboard is another solid product of the type that Ideassociates is becoming known for. It offers yet another excellent way to get more out of older systems by packing more into them with only a moderate investment.

All Aboard is a product well worth considering for micro managers and users concerned with maximizing the value, utility and installed base of older personal computers.

Micro prices offered on disk

From page 35

Although initially successful, the telephone hookup time was expensive for clients, especially those from as far away as Australia. "Telephone costs get prohibitive after about 10 minutes," Simmons said.

To reduce client costs, IBC/Innovention produced a diskette version of the data base and will send out a new version every month. The information is also available on hard copy. The price per diskette is $10, but as part of a special introductory promotion, each disk will cost $4.95.

And in case you were wondering, the cheapest IBM-compatible micro last month cost $263 and came with 256K-byte random-access memory.

Lotus TAC reworks Ilink

From page 35

micros include, of course, Symphony and 1-2-3, as well as Ashton-Tate's Dbase. Other products are expected to follow. The integration they provide permits the user to invoke the transfer technology with a simple keystroke combination from within a micro application program.

The personal computer interface modules are optional — the micro driver in TAC handles all the communication with the mainframe driver and processes data dictionary information. The use of the various micro interface modules simply makes the process more seamless and permits the generalization and sharing of applications.

What kind of link used is not very important to Lotus, but they do expect something, either coaxial boards, such as Irma from Digital Communications Associates, Inc., or some asynchronous package like Relay from VM Personal Computing, Inc.

Lotus is targeting those installations that already have a base of link products, either purely hardware-based, or existing software products that are not sufficiently integrated into the micro environment.

This implies, of course, that Lotus is not selling any link technology at present. Shore confirms this and agrees that after a number of large installations are in place and the smaller sites are targeted, a full line strategy might be in order. Some discussions are taking place with various link vendors, but Lotus is not prepared to discuss these at present.

It is obvious, however, that it is in Lotus's interest to be able to offer their customers a complete solution. Further, there should be several levels, depending on the need for speed and flexibility. A very high-powered transfer product like one of the new VTAM resident links, such as Tangram's Arbiter, would be a high-priced, high-performance solution for organizations with large amounts of data that need to be moved rapidly on an already busy mainframe system, while an asynchronous product that supported full-screen capabilities and included a full-function program language would be optimal for remote applications.

Given TAC's ability to have the various program modules call each other without user intervention, this sort of product, like Relay Gold from VM Personal Computing, Inc., would be ideal for application development.

It is clear that Lotus intends to move as much of the processing as possible off the mainframe. The ultimate result of this strategy would be a product that permitted the creation of parameterized reports on the micro. Ideally, a fully active data dictionary would be micro-resident and would guide the creation process. Once the request was completely designed, it would be moved to the mainframe for execution.

The mainframe driver controls and directs processing, passes requests to the appropriate product interface, translates to PC format and adds the information data base, which serves as a portable data dictionary, to the download file.

Shore pointed out that there were two primary goals during Lotus' redesign of the Ilink mainframe portion: enhanced performance and a reduction of the number of parameters that must be supplied by the user. As much as possible, this process has been reduced to menu selection based on the data dictionary.

The product interfaces range from $8,000 to $10,000. Standard QSAM and CMS file formats are routinely accessible without special interfaces.

Adrian is chairman of the micro-to-mainframe Special Interest Group of the New York PC Users Group and senior programmer/analyst at Shearson Lehman Brothers, Inc.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

CPU slump: Myth vs. reality

There may be little consolation for IBM as its profitability continues to slip, but fingers that so readily point to mainframes to place blame for the so-called computer industry slump may be a little off target.

Some surprising numbers came out of Computer Intelligence a few weeks ago when the La Jolla, Calif., research firm published its semiannual list of the top 50 computer systems. The list, ranking systems according to the value of computers and peripherals installed in the U.S., showed IBM's 3090 Model 200 vaulting from fifth place in January to the top slot in July. The Model 200 was in the prime of its delivery cycle in early 1986, so that jump should not have come as a shock.

What may be the real surprise to a person looking for the cause of what is perceived as a large-systems slump is that the number of IBM mainframes actually increased between January and July. That growth allows for removal of some of IBM's older and less powerful mainframes, such as the 3033 and 3083, which are often replaced by 3090s.

According to Computer Intelligence, IBM customers were using 5,582 IBM mainframes, including 3030s, 3080s and 3090s, in January. That number rose to 5,697 in July, with some of IBM's most powerful and most expensive processors — the Model 200, the 3084 and the 3081 — showing some of the strongest growth.

See **CPU** page 44

Connolly is Computerworld's *senior editor, systems & peripherals.*

NEC unwraps first in series of engineering workstations

By James Connolly

BOXBORO, Mass. — Jumping into the deskside engineering workstation market, NEC Information Systems, Inc. has introduced its first such product.

NEC said the EWS-E is the first in a series of workstations designed for use in applications such as computer-aided design and manufacturing, mechanical and electrical computer-aided engineering, technical publishing and computer-aided software engineering.

The EWS-E is based on Unix and the 16.67-MHz Motorola, Inc. 68020 microprocessor. A second 68020 is dedicated to multiwindow generation.

The workstation reportedly features a 32-bit system bus, 4M to 32M bytes of memory, a Motorola 68851 paged-memory management unit and a Motorola 68881 floating-point math coprocessor.

It uses AT&T Unix System V Release 2.2 with University of California at Berkeley Unix 4.2 and NEC extensions. The user interface is NEC Windows, a multiwindow management system.

"The industry demands open architecture and standard operating systems in stand-alone workstations, and NEC is committed to providing the market with superior quality, high-performance systems. With our advanced workstation, we have integrated the leading graphics and video technologies at a very competitive price for large OEMs, value-added resellers and systems integrators," said Frank Girard, vice-president of systems marketing for NEC.

The list price for the EWS-E starts at $27,500.

The workstation reportedly supports IBM's 5080 graphics order set and provides 5080 emulation capabilities through a joint development agreement with CGX Corp. The EWS-E also supports Ethernet

See **NEC** page 45

Xerox unveils Interpress tools

Eases link between its printers and IBM systems

By James Connolly

ROCHESTER, N.Y. — Xerox Corp. last week introduced a series of software and hardware products designed to support closer ties between Xerox printers, IBM mainframes and other systems.

The announcements included a group of software components of the Xerox Document Printing Architecture (XDPA), which eases links between Xerox printers and IBM and compatible mainframes running IBM MVS/XA and MVS/370. The software, called the Xerox Printer Access Facility (XPAF), is the first implementation of the Xerox Interpress document and page description language for mainframes.

"In its final form, XPAF will provide a unity of view for companies whose IBM systems are linked to Xerox printers. By offering a uniform interface to Xerox printers, XPAF will enable applications developers to easily direct program output to the optimal printer," said Robert V. Adams, president of Xerox Systems Group.

The software is intended for use with systems with IBM's Advanced Function Printing (AFP) facility for all-points-addressable printing or non-AFP systems running in line mode.

Xerox also announced a hardware adapter that it claims allows non-IBM systems to be channel-attached with Xerox's centralized printers, a raster image processor and a series of software facilities for creating and maintaining libraries of graphics, forms and fonts. The company also said it plans to develop software to link Xerox printers with widely used data

See **XEROX** page 44

Wood products company finds relief from mainframe costs

Uses multiprocessor for financial functions

By Donna Raimondi

EUGENE, Ore. — A small wood products company, on the verge of upgrading its low-end mainframe to handle increased business, decided instead to use a parallel computer in its commercial environment.

"I made a decision that Unix and the C language was the way we wanted to go because it offered the greatest degree of portability that exists in the marketplace. And with all the hardware we looked at, nothing compared price/performance-wise to multiprocessor systems," says Timothy Justice, data processing manager at the 300-employee Whittier Wood Products, a manufacturer of unfinished furniture.

For 12 users, Whittier had a Burroughs Corp. B1990 low-end mainframe with a maximum 2M bytes of memory. Justice and the firm's other programmer wrote for the mainframe in Linc, a Burroughs fourth-generation language. "We were planning to get a slave processor for the B1990, then Burroughs recommended that we consider moving up to an A3. Then, while we were contemplating that, Burroughs made a change in the licensing agreements on Linc," Justice says.

Although Whittier had a lifetime license on Linc, Burroughs dropped support for Linc and offered instead a version called Linc 2. The vendor offered Whittier a free four-year license, after which Whittier would have to pay approximately $40,000.

"Since we develop all of our own software, I came to the conclusion that it was not to our advantage to write in a proprietary language. We were getting ourselves backed into a corner," Justice claims. Unix and C offered the software portability Whittier needed, but no decision had yet been made on hardware.

After looking at "all the standard vendors I could think of" — IBM, Digital Equipment Corp., Sperry Corp. and others — Justice chose Sequent Computer Systems, Inc.'s Balance 8000 parallel processor. "In all the systems we looked at, nothing compared for price/performance or ease of upgrade," Justice says. He installed the Balance 8000 with 8M bytes of memory in a two-processor configuration, which can be upgraded to 16M bytes and 12 processors.

The system is used for financial and related purposes, Justice says. He runs all the usual accounting functions — accounts payable, receivables and general ledger — payroll and some manufacturing packages. "There are two ways to run in parallel," Justice explains. One way is to break one job down to run in parallel on several processors, which is not Whittier's way to use the machines. "The other way is simply that the operating system automatically dynamically balances throughput because you are not competing for the same processor with everybody else. You are divided across however many processors you have. It speeds the throughput tremendously."

Response time has improved dramatically, Justice says. The Burroughs and Sequent system architectures are radically different, so they are hard to compare, he says. "But

See **WOOD** page 45

INSIDE

NEW THIS WEEK

- HP offers 5¼-in. high-capacity disk drives

For more on this and other new products, see pp. 81-92.

INSTANT ANALYSIS

"Even if you run the same software on these boxes, the software could still be the major investment."

— A DP manager in a Fortune 500 company on IBM offering lower software prices for users of its new 9370 mid-range system

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College, GE make 'fastest transistor'

By Donna Raimondi

CHAMPAIGN, Ill. — Scientists at the University of Illinois and General Electric Co. claim to have developed the world's fastest transistor.

The transistor could signal major advances in supercomputing, telecommunications, real-time signal processing and space exploration, said Hadis Morkoc, leader of the Illinois research group and a professor in the university's Coordinated Science Laboratory.

It could be several years before computer makers use the chip, although the National Aeronautics and Space Administration and the U.S. military will almost certainly use it within two years, Morkoc said. "Access time on a Cray 2 [supercomputer from Cray Research, Inc.] is about 2 nsec, but if Cray used chips with these transistors, it would be cut in half," he added.

Although the transistor is more than two times faster than what Cray uses, Morkoc does not anticipate much immediate interest from computer vendors because of the time and expense involved in learning to implement the technology.

The researchers, who filed for a patent application Sept. 19, claim to have discovered a way to improve transistors made of gallium arsenide-based compounds. The device consists of a gate embedded in a layered structure made of semiconductor compounds (indium gallium arsenide and aluminum gallium arsenide), Morkoc said.

The projected maximum frequency of operation is 230 GHz, meaning the transistor switches 230 billion times per second.

Low-noise performance allows the device to detect signals weaker than those detected by other transistors. This fact could affect computer architecture because it could eventually lead to better circuit design, Morkoc said.

Before he is satisfied with the transistor, Morkoc said he wants to do further development. "This is the first cut, and it's very encouraging. Now I would like to go through two or three optimizations before I move on to something else."

Convex adds supercomputers

By James Connolly

RICHARDSON, Texas — Convex Computer Corp. has announced an architecture that allows multiple Convex C-1 supercomputers to operate independently or in parallel.

Convex also introduced a lower cost C1 XL version of its system and a higher performance C1 XP, which reportedly allows multiple-processor configurations modeled after the Cray Research, Inc. X-MP systems.

The Convex Extended Supercomputing Architecture (CXS) reportedly uses a fiber-optic connection to allow C-1s to work simultaneously but independently on multiple individual applications or to work in parallel to solve separate parts of a problem.

CXS uses Convex processors as nodes and 80M bit/sec. interconnects. Nodes can be complete systems and can transparently access files and applications on other nodes.

The C1 XL was designed to support up to 64M bytes of memory and an 80M byte/sec. I/O bandwidth. Prices for the system start at $350,000.

The C1 XP is now the high-end Convex machine and uses 1M-bit chip technology to support a physical memory of up to 1G byte. It reportedly offers a 50% improvement in performance over the C1 XL. Prices start at $475,000. It also is available in two multiprocessor versions, the XP2 and XP4.

Xerox unveils Interpress tools

From page 41

bases and applications software products running on mainframes, minicomputers and microcomputers.

The hardware adapter is the Spur Products Corp. Universal Subsystems Adaptor, which allows channel connection of non-IBM systems with Xerox 9790, 9700, 8790, 8700, 4050 and 4060 printers. The other third-party hardware device is the KMW Systems Corp. RIP-200XI raster image processor.

The XDPA package is scheduled for delivery during the second half of 1987 at a typical cost of about $10,000.

CPU slump: Myth vs. reality

From page 41

What may be happening is that rather than falling off, mainframe use is still growing, just not as fast as some people wish. And, before one lays the blame on the mid-range, note that IBM's superminicomputer-class 4381 showed more gains than its obsolete predecessor 4341 lost.

So, it may be that IBM's slow growth and the clear-cut losses for other vendors are results of sluggishness up and down the performance scale and not limited to mainframes.

Wood firm finds cost relief

From page 41

the overall result we can compare," he says. It took 15 to 20 minutes to compile a program on the B1990 that included a listing program and a simple sequential file read-through that looked up other files randomly. The same task took 15 to 20 seconds on the Balance. Response times on applications software were running two to three minutes in peak hours, which is an unreasonable length of time, Justice finds. Response time now is immediate.

"If I want to add processors, all I have to do is power the system down, put a circuit board in — which I can do myself — and power the machine back up," Justice says. Adding two processors would cost about $16,000. Adding comparable power in a traditional superminicomputer or small mainframe environment would cost about $250,000 because an entire CPU would have to be added, he says.

"The other vendors we looked at offered bids that were reasonably competitive for the initial installation, but then upgrades are just unreasonable," Justice observes.

"My anticipation is we will add more processors by spring, because we have already added a tremendous amount of enhancements in the process of rewriting," Justice says. A subsystem for managers of the company's machine maintenance department has already been added, which will significantly increase system usage.

Justice and the programmer who works with him are busy rewriting all software from Linc to C for the new processors. When they finish, the B1990 will be disconnected. "I gave the software rewrite six months, and that appears to be just what it will take," he says.

An unanticipated benefit has been the ease of interfacing other vendors' equipment with the Balance, Justice says, noting that the Sequent system allows his company to attach products such as IBM Personal Computers, Wyse Technology, Inc. terminals and Dataproducts Corp. printers.

"Most everything I can think of on the Burroughs was proprietary. You can't just go out and buy a Dataproducts printer, let's say, and put it on without getting a special Burroughs proprietary interface for it," Justice comments.

NEC unwraps workstation

From page 41

with the Transmission Control Protocol/Internet Protocol.

The display is a 20-in. color display with a landscape format and 1,280- by 1,024-pixel resolution, according to NEC. The Video Information processor reportedly allows National Television Standard Code-level video signals, full-motion video picture, window location and size under program control.

Standard disk storage is provided by a 5¼-in. floppy disk drive and an 86M-byte hard disk drive.

Star scales down array processor unit

By David Bright

STERLING, Va. — Star Technologies, Inc. has announced the commercial availability of an array processor originally developed for specific applications, which is designed for speeding up a broad range of compute-intensive applications.

The 32-bit ST-50 works in conjunction with systems from Digital Equipment Corp., IBM, Gould, Inc., Apollo Computer, Inc., Concurrent Computer Corp. and Control Data Corp. and performs 50 million floating point operations per second, according to Star.

Applications include signal and image processing, radar and sonar analysis, molecular modeling, testing and structural analysis, satellite data processing, flight simulation and aircraft design. Star first developed the basic design for use with General Electric Co.'s Medical Systems medical imaging systems.

The $115,000, rack-mountable ST-50 is the smaller brother of Star's high-end ST-100 array processor. Using high-density CMOS technology, the machine reportedly provides similar functionality at half the ST-100's speed, less than half its price and one-sixth its size.

"The product's compact size, multiprocessor architecture and advanced CMOS technology give it the speed, functionality and flexibility for a broad range of computationally intensive applications, particularly where size, speed and cost are important considerations," said Pete Soriano, sales and marketing director.

A basic configuration includes a 512K-word main memory, a 48K-word data cache memory, four I/O external ports (including a very high-speed DMA port), a host channel interface and maintenance operating and development software.

The ST-50 contains four independent programmable processors, can operate on a single-user or multiuser basis and supports multitasking as well as multiple host connections. The machine is said to queue multiple jobs and overlap data transfers without interfering with arithmetic processing.

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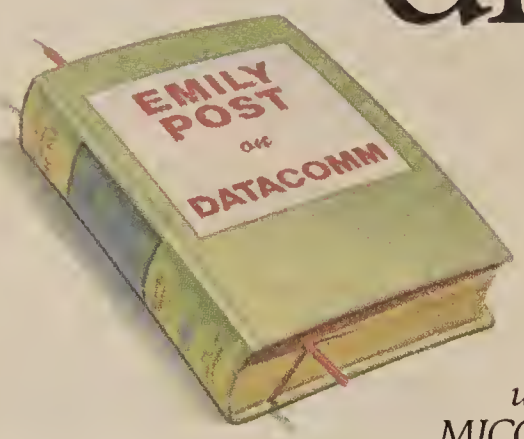

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Product Spotlight

Edited by Barbara Wierzbicki

ILLUSTRATION BY BRUCE GILFOY

INSIDE

The EGA standard

Here today, gone tomorrow?

By LYNN HABER

Today's enhanced graphics adapter (EGA) capability may just be one watering hole along the marathon route of evolving personal computer-based graphics. But according to end users, EGA is quenching the demand for affordable, quality graphics.

"Very simply, EGA makes sense," says Michael Reichwald, executive vice-president at Brilliant Image, Inc., a production company located in New York. "Sure, I'd like to see 1,024 by 1,024 resolution low-end graphics, but today we have what we have, and EGA offers good resolution and software support for the right price."

At the Marshall Space Flight Center in Huntsville, Ala., EGA satisfies "as broad a range of functions as possible without having to go to a more costly professional graphics board," a spokesman reports. Required application areas at the center include administration, scientific and engineering and research and development.

Yet despite such good reviews for the de facto industry standard EGA, it is not the be-all and end-all for PC graphics, leaving users in the ever-widening gyre of rapid technological development and product obsolescence.

Bill Meserve, an industry consultant with Arthur D. Little, Inc. of Cambridge, Mass., suggests, "In nine months, EGA will be a moot point." He, along with other industry observers, expects bit-mapped graphics to be built into the next generation of PCs, thus eliminating the need for the add-on board.

"What's exciting today is graphics, not the PC. All add-on boards do is make up for a deficiency in the product. The PC is an old technology that IBM perpetuates and that people live with," Meserve says.

First find the software package that meets your business needs and then choose an EGA board that will support it.

And many people at that. At last count, the installed base of IBM Personal Computers and compatible machines was approximately six million units. And for many end users looking for a low-cost graphics solution that they can use today, EGA is shaping up to be the best way to go.

"We're excited about EGA, not because it's the best card on the market, but because the price is right. A lot of the people we deal with also use it, and the software base is growing," Reichwald says.

Since its introduction in 1981, the IBM PC has matured to become an intelligent workstation

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Haber is a free-lance writer based in Boston, Mass.

EGA standard short-lived?

Continued from previous page

device capable of performing an increasingly diverse set of applications. This includes computer-aided design and manufacturing (CAD/CAM) and desktop publishing, to name a few, which previously relied upon the backbone performance of a host mainframe.

But in order to satisfy the requirements of those sophisticated applications on a competitive level with more expensive and higher performance specialized workstations, the PC needed improved graphics capability.

First came improvement upon IBM's Monochrome Display Adapter (MDA), pervasive among users but incapable of displaying graphics images. Hercules Computer Technology, Inc. of Berkeley, Calif., introduced the Hercules Graphics Card, which added high-resolution (720 pixels by 348 lines) graphics capability to the IBM PC monochrome display.

Drawing upon the support of the Lotus Development Corp. 1-2-3 spreadsheet, users were able to see neat and concise graphic representations of their work. Hercules was on its way. Sales soared and other software manufacturers rushed in to embrace the graphics card, establishing the product as a de facto industry standard.

IBM, meanwhile, offered the Color Graphics Adapter (CGA) as a companion to the IBM Color Display Monitor. CGA, with 16K bytes of storage, displayed four basic colors in resolutions of 320 pixels by 200 lines and had a black-and-white resolution mode of 640 pixels by 200 lines. But the CGA could not combine color with 80-column text, and IBM customers wanting color images were forced to spring for an IBM color monitor.

At this point, graphics capability for the PC was like mashed potatoes. There were displays for color, for black and white and for text and graphics, but no product could display quality color graphics that combined text and graphics. IBM's CGA card did not satisfy the demands of business users who were awakening to the razzle-dazzle of popular color video images. But then, it had not been designed with the corporate user in mind.

Finally, in September 1984, IBM introduced the Enhanced Graphics Adapter card with 64K bytes of memory, expandable to 256K bytes, 16 colors and 640 by 350 graphics resolution for the business community. At the same time, IBM introduced the expensive Professional Graphics Adapter (PGA), aimed at scientific and engineering applications.

But EGA did not come cheaply. The original IBM add-on board equipped with an enhanced display monitor, the preferred purchase for maximum resolution and color, cost approximately $1,500. In addition to its high price tag, software support for the product was nonexistent. Further, IBM's EGA board did not support the abundance of software written for the Hercules card, and compatability with CGA products was minimal.

Nevertheless, IBM's EGA card set the stage for the showdown on high-resolution PC graphics. This stage came alive with the introduction in September 1985 of the EGA Chipset from Chips and Technology, Inc. in Milpitas, Calif. Before the year's end, at least half a dozen companies, using the EGA Chipset, introduced more fully featured EGA-compatible products priced at around $600.

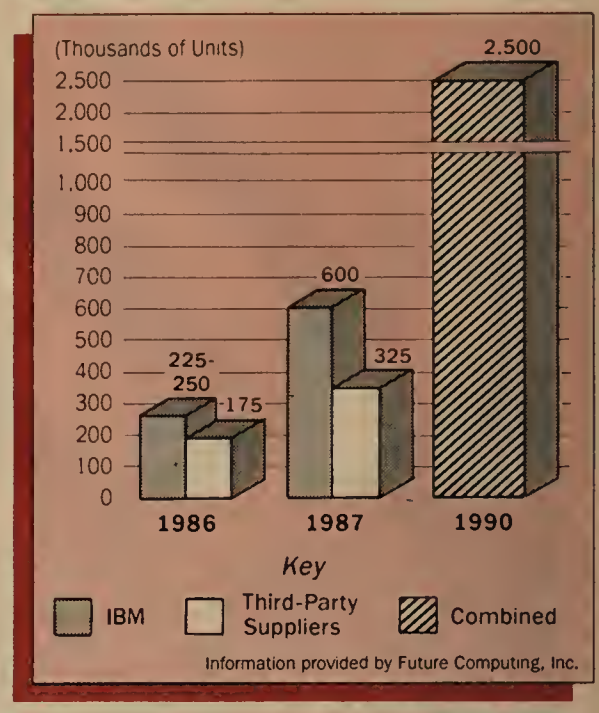
With a decline in the cost of EGA hardware combined with increased performance capability and the software support of companies such as Lotus, with 1-2-3 and Symphony, Digital Research, Inc.'s Graphics Environment Manager and Microsoft Corp.'s Windows, EGA grabbed the attention of the business community.

According to Hedy Taub, senior researcher at Future Computing, Inc., a market research company in Richardson, Texas, all major board manufacturers currently market EGA products. Such companies include AST Research, Inc. in Irvine, Calif.; Genoa Systems Corp. in San Jose, Calif.; Quadram Corp. in Norcross, Ga.; and Paradise Systems, Inc. in South San Francisco.

Taub reports that IBM currently captures a 60% market share. By the end of this year, IBM will ship approximately 225,000 to 250,000 units, compared with 175,000 units that will have been shipped by third-party suppliers. By 1987, the number

JEFF BABINEAU

EGA BOARD SHIPMENTS PREDICTED TO SOAR



of units shipped will more than double, with IBM shipping 600,000 units and third-party vendors supplying 325,000 units.

And by 1990, the total number of medium- to high-resolution color graphics boards shipped is expected to reach 2.5 million units, according to Future Computing.

Schail Malik, an industry analyst at Dataquest, Inc. in San Jose, says that users can choose an EGA board from more than 50 suppliers. Products run the gamut, from low-end (priced under $250) boards from no-name clone vendors to the more popular EGA boards, priced between $400 and $600, from companies like AST and Quadram.

These boards have virtually standardized 256K bytes of random-access memory (RAM) for more effective graphics control. They also offer backwards compatibility with MDA, CGA and the Hercules card. So all appears bright in the graphics world, right? Wrong.

No sooner is the PC user community introduced to this plethora of add-on graphics cards then there suddenly appears a second generation of EGA products. Matching its predecessors in price and performance, the second generation of color boards further provides increased resolution capability, half-slot cards and additional I/O options.

According to Larry Liang, vice-president of marketing and sales for Genoa, the price war among EGA manufacturers came too fast. "It became obvious very quickly that the 'me-too' product wasn't smart for too long," he says. So to differentiate the second-generation Genoa product from the company's first Spectra EGA product, based on the Chips and Technology Chipset, Genoa is introducing an enhanced EGA option card based on a proprietary chip.

The yet-to-be-named product, in addition to incorporating MDA, CGA and EGA on a single chip, will support 640 by 400 resolution and will supply 132-column by 44-line images for full spreadsheet display. The card, which will reportedly be compatible with all monitors, is slated to be available by the end of this year. Pricing has not been established, Liang says. Genoa will also introduce a half-card version.

Quadram recently introduced the QuadEGA Prosynch, a follow-up to its QuadEGA+ board that packs four video displays into one board.

QuadEGA Prosynch operates with a variety of graphics software on variable-frequency monitors, such as the Multisynch monitor from NEC Home Electronics, Inc. The Multisynch monitor eliminates the need to purchase a different monitor for each adapter because it is capable of operating with a variety of adapters, such as CGA, EGA and PGA.

According to James Rush, general manager of graphics at Quadram, the 12-in. or 14-in. Multisynch screen displays 39% more data than an EGA screen of comparable size. The prices of the company's QuadEGA+ and Prosynch products are $495 and $595, respectively.

Jim Carzoli, who is a lead client support analyst at The Southern Co., says that when the multifunction QuadEGA+ board hit the market, he jumped on it. "I found it took care of the issue of incompatibility between CGA and EGA."

> ***'I get bombarded with requests for EGA, but what I discover is that customers really don't understand it. As a starter product, I tell them that EGA is good for the present, but will it be good for later?'***
>
> — Tom Sinopoli
> Boston CADD Systems, Inc.

He says that the company had tried to standardize on IBM products, like the Personal Computer AT and the MDA, CGA and EGA add-on boards. "But then we found that software designed for CGA was not compatible with the new EGA. We thought that eventually IBM would catch up."

Carzoli reports that the company uses about 100 EGA boards and concedes that price was a consideration when purchasing a graphics adapter for the PC.

Is he frustrated by the evolving nature of PC graphics standards? "Yes, but we just recognize that this is going to happen."

Working together toward product standardization, manufacturers continue to offer multifunction products with backwards compatibility. Yet, while today's user can more easily purchase one board and one monitor and find suitable software, issues of incompatibility remain. It is still sometimes necessary to swap boards or to flip DIP switches for proper device configuration.

That is, unless you have discovered Autoswitch EGA from Paradise Systems, Inc. The Autoswitch is an intelligent device that enables users to make the transition from EGA mode to other video modes transparently.

"The EGA user is interested in one thing — results — charts, graphics, whatever, with minimum hassle," says Thomas VanOverbeek, vice-

Continued on page 54

Printer advances, plus EGA, clean up graphics hard copy

By ALAN PALLER

While enhanced graphics adapter (EGA)-equipped computers enhance on-screen graphics, these cards alone contribute little to the quality of graphics presented on paper, overhead transparencies and slides. It takes much more than an EGA card to make a personal computer produce high-quality hard copy.

During 1985 and so far this year, cost reductions and resolution improvements have revolutionized the graphics hard copy market. The most important of these improvements have occurred in the black-and-white laser printer market, but significant changes have also affected the color hard-copy market, especially in the ink-jet, thermal transfer and electrostatic printer areas.

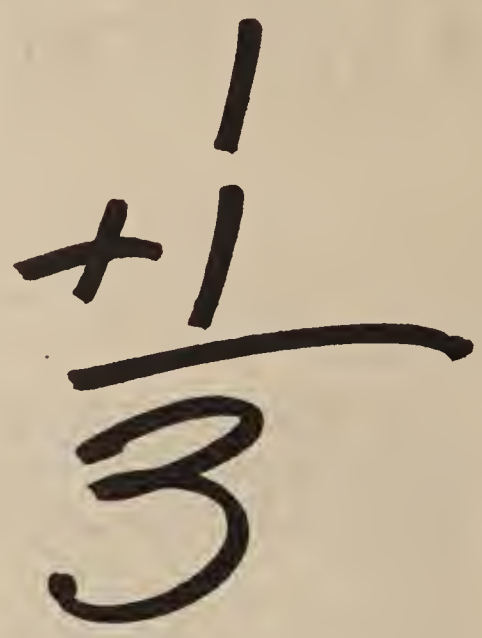
Laser printers are the alphanumeric printers of choice for most computer users. And the newer breed of lasers, by virtue of their included graphics capabilities, now appeal to graphics-oriented users as well. Together with updated graphics packages, laser printers such as the Apple Computer, Inc. Laserwriter and the AST Research, Inc. Turbolaser are remedying the once-frustrating inability to produce charts on laser printers.

The 1986 season has to date witnessed the most rapid improvements in color hard copy in over a decade. Page-size color electrostatic printers have been announced. Ink-jet technology has reached 200 dot/in. At the same time, speeds have improved. The new 300 dot/in. thermal transfer printers can produce a full page of graphics, on paper or on transparency film, in less than one minute.

Personal computers produce hard copy via one of two principal methods: screen copy or direct transmission. Screen copy takes a snapshot of the picture on the screen and transmits it to the hard-copy device at exactly the same resolution as was shown on the screen. Direct transmission, on the other hand, recreates the picture at the full resolution that the hard-copy device can support.

The difference is substantial. A screen copy may have only 200 by 300 pixels — for IBM Color Graphics Adapter (CGA) — or 350 by 640 pixels — for IBM EGA. A laser printer or a thermal transfer printer can use 2,400 by 3,000 pixels. Some film recorders offer even higher resolution. Even the least expensive ink-jet printers offer 800 by 1,000 pixels. Direct transmission takes full advantage of the greater detail available on the hard-copy devices.

Users who choose screen-copy hard-copy devices will see improvements in the quality of their hard copy when they switch from CGA to EGA, but they would see much more improvement if they switched to direct transmission — regardless of which card they used.



However, direct transmission is not simple; every hard-copy equipment manufacturer uses a unique set of commands to make those devices work. Users can take advantage of a graphics hard-copy device only if the PC graphics software knows the commands. Some graphics software cannot support the higher resolution hard-copy devices even if it understands the right commands. These limited software packages, called "paint" packages, allow users to manipulate individual pixels. However, since there are a finite number of points on a screen, switching from screen copy to direct transmission in this instance will not improve resolution.

Fortunately, the vast majority of graphics packages, including nearly all word, bar and line charts as well as the more sophisticated charting programs, can support direct transmission. Today, there are more than 100 different direct-transmission hard-copy devices, and more are being developed every month.

Now that graphics hard-copy equipment can produce the quality users need, an effective graphics strategy should include both better screen resolution and improved hard-copy quality. Implementing that strategy requires that users upgrade their equipment and that they acquire new software to take advantage of the enhanced hardware.

During the next nine months, a new generation of PC graphics software will become available that brings to micros the type of high-quality graphics previously available only on minicomputers and mainframes. The combination of better software, improved EGA screen resolution and higher quality output of the new hard-copy equipment will herald an age in which graphics are a utility available on every PC. ■

Paller is president of AUI Data Graphics/Issco, a Washington, D.C.-based firm specializing in computer graphics and visual information systems consulting and training, and a director of the National Computer Graphics Association.

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Continued from page 49

president of marketing at Paradise. "We're driving to make our video card virtually invisible to the user," he adds.

A spokesman from the Marshall Space Flight Center echoes VanOverbeek's assessment. "I like the capabilities of Autoswitch, of being able to use any software — MDA, CGA and EGA. I'm interested in attaining results. You don't have to swap graphics boards or flip DIP switches."

Autoswitch EGA incorporates the company's proprietary PEGA 1 video controller chip and costs $599.

Further, Paradise recently introduced the PEGA 2, an extended EGA mode with a resolution of 640 by 480 pixels. According to the company, the chip allows OEMs to market PCs based on Intel Corp.'s 8086, 8088, 80286 and 80386 processors with continuous-frequency monitors. VanOverbeek would not comment on the introduction of a board-level product based on the PEGA-2 chip.

While many EGA users are satisfied with the resolution for business presentation graphics, they would like to see products that have a quicker response time and more standardization between hardware and software.

An even louder chorus of complaints can be heard from users running CAD/CAM and more sophisticated desktop publishing types of applications. "Users in these areas, and also those in process control and laboratory implementation, are putting pressure on the manufacturers for higher resolution systems," Machover says.

"Overall, software support is still the weak link to better looking graphics. Eventually, the user will see the utility, but it will be at a higher price," he adds.

Tom Sinopoli, a systems integrator at Boston CADD Systems, Inc. in Boston, says that he only recommends EGA as a minimum for CAD applications. "I get bombarded with requests for EGA, but what I discover is that the customer really doesn't understand it," he says. "As a starter product, I tell them that EGA is good for the present, but will it be good for later?"

Daniel M. Hall, president and chief operating officer at CORD (Center for Occupational Research and Development), a company that distributes sophisticated instructional material, says that his company is currently evaluating various EGA products as part of its search for a desktop publishing system that handles text, graphics and page design. "But we have not seen a package that would give us the quality illustration that we need."

Bret Berg, product marketing manager of graphics at AST Research, reports that customers of the company's AST-3G Plus and AST-3K Pak EGA card say that they use it in any one of four applications areas — business presentation graphics, CAD/CAM, office automation and desktop publishing.

But even Berg concedes that in the CAD/CAM and desktop publishing area, EGA satisfies only base-level applications.

While the quickest route to adding graphics capability to a PC may be to run to the nearest retail store and install the board yourself, depending upon the application and the degree of functionality required, the knowledge and experience of a systems integrator may be the preferred route.

"There is a growing concern that for niche-market applications, retail stores do not have the expertise or technical knowledge to sell EGA cards," Machover says. "Value-added resellers and OEMs, people that deal in vertical markets, supply support, rather than bits and pieces."

While some stores are set up to deal with the more sophisticated EGA packages, the bottom line, according to Machover, is that the majority of sales are coming from turnkey systems from the value-added reseller and systems integrator.

A tip for potential EGA users from the industry consultants is to first find the software package that meets their business needs and then find an EGA board that will support it.

James Edwards, senior consulting engineer at the Millipore Corp. in Bedford, Mass., currently uses four EGA boards — three EGA Plus products from STB Systems, Inc. in Richardson, Texas, as well as the EGA Master board from Tecmar, Inc. in Solon, Ohio.

When the retail store told him that the IBM EGA card he wanted was back ordered, he bought the STB product instead — and soon discovered that it was not completely hardware and software compatible with the other equipment he used.

"I found that the STB board was a good product for the money — it gives good crisp lines — but unfortunately, it is not totally compatible with the Tecmar board we had," the consultant says.

Edwards explains that when he switches software, the colors are wrong and the screen display varies. "When I run [Autodesk, Inc.] Autocad, for example, I find some of the menu is cut off."

Edwards admits that his preference is to use a higher quality, non-EGA graphics board, but cost is an issue. "We would be better off from an applications point of view with a higher end graphics board, but now we are talking a three-to-one cost factor. With the money we save by going with EGA, we can purchase another monitor instead," he points out.

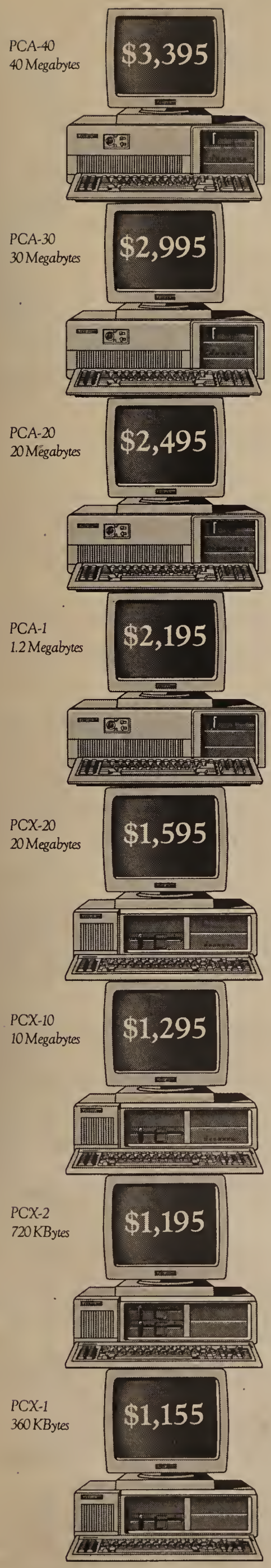
For good and for bad, EGA as we know it today is unlikely to be the EGA of tomorrow.

Responding to the never-ending demand for higher resolution, more than one industry observer speculates that IBM plans to introduce a higher resolution (640 by 480 pixels) EGA board. Moreover, current users would like to see faster processing speeds, additional software support, more color and the adoption of industry standards for product interoperability.

The most significant change in the boards themselves will undoubtedly be the addition of a graphics coprocessor chip. Coprocessor chips, which off-load the graphics functions from the personal computer's CPU, can improve product performance three to 10 times over current product performance.

Companies such as Advanced Micro Devices, Inc. in Sunnyvale, Calif.; Intel, based in Santa Clara, Calif.; and Texas Instruments, Inc. in Dallas are already marketing such products.

But improvements in EGA boards alone are not enough to enhance graphic capability. Manufacturers of software, monitors and printers will have to combine their efforts if affordable, high-resolution PC graphics are to become a reality. ■



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EGA BOARDS

Company	Product	Card Length	Display Memory (K bytes)	Textmode Format (columns by lines)	Character Resolution	Screen Resolution (pixels)	Maximum Simultaneous Colors	Graphics Software Provided	Price
AST Research, Inc. 2121 Alton Ave. Irvine, Calif. 92714	*AST-3G Plus*	Full	256	80 by 43	9 by 14	640 by 350	16	Yes	$650
Atronics International, Inc. Building 1, 491 Valley Way Milpitas, Calif. 95035	*Megagraph Plus*	Half	256	80 by 25	9 by 14	720 by 348	16	No	$299
Basic Time 3040 Oakmead Village Drive Santa Clara, Calif. 95051	*BT/EGA*	Full	256	80 by 25	9 by 14	640 by 350	16	Yes	$349
Control Systems, Inc. 2855 Anthony Lane Minneapolis, Minn. 55418	*Artist Transformer*	Full	160	80 by 25	8 by 16	640 by 400	16	Yes	$1,495 analog, $1,295 TTL
Emulex/Persyst 3545 Harbor Blvd. Costa Mesa, Calif. 92626	*EG-8*	Full	256	80 by 25	8 by 14	640 by 350	16	No	$599
Everex Systems 48431 Milmont Drive Freemont, Calif. 94538	*Enhancer*	Full	256	80 by 25	9 by 14	640 by 350	16	Yes	$399
Genoa Systems Corp. 73 E. Trimble Road San Jose, Calif. 95131	*Spectra EGA Model 4800*	Full	256	80 by 25	9 by 14	720 by 350	16	Yes	$449
IBM 100 N.W. 51 St. Boca Raton, Fla. 33432	*Enhanced Graphics Adapter*	Full	256	80 by 40	8 by 14	640 by 350	16	No	$982
Mylex Corp. 5217 N.W. 79th Ave. Miami, Fla. 33166	*EGA*	Full	256	80 by 25	8 by 14	640 by 350	16	No	$495
NSI Logic, Inc. Cedar Hill Business Road Marlboro, Mass. 01752	*Epic EGA Board*	Full	256	80 by 25	9 by 32	720 by 400	16	Yes	$595
	Smart EGA	Half	256	80 by 43	8 by 14	720 by 350	16	No	$549
	Epic Graphics Adapter	Half and full	256	80 by 43	8 by 14	640 by 350	16	No	$359
Paradise Systems, Inc. 217 E. Grand Ave. South San Francisco, Calif. 94080	*Autoswitch EGA Card*	Half	256	80 by 25	8 by 14	640 by 350	16	No	$599
PC Designs, Inc. 5837 S. Garnett St. Tulsa, Okla. 74146	*PC Designs Enhanced Graphics Adapter, PC Designs EGA Plus*	Half	256	80 by 43	9 by 14	720 by 348	16	No	$299-$325
PC Source 12303-G Technology Blvd. Austin, Texas 78727	*Standard EGA Card*	Full	256	80 by 25	8 by 14	640 by 350	16	No	$199
Quadram Corp. One Quad Way Norcross, Ga. 30093	*QuadEGA+*	Half and full	256	80 by 25	9 by 14	640 by 350	16	No	$495
Sigma Designs 46501 Landing Pkwy. Fremont, Calif. 94538	*Sigma EGA*	Half	256	80 by 43	9 by 14	640 by 350	16	Yes	$495
STB Systems, Inc. 601 N. Glenville, #125 Richardson, Texas 75081	*EGA Plus*	Full	256	80 by 25	8 by 14	640 by 350	16	No	$495
Tatung Co. of America 2850 El Presidio St. Long Beach, Calif. 90810	*TEGA-22*	Half	256	80 by 25	8 by 14	640 by 350	16	No	$545
Tecmar, Inc. 6225 Cochran Road Solon, Ohio 44139	*EGA Master*	Full	256	80 by 25	9 by 14	640 by 350	16	No	$395
Tseng Labs 205 Pheasant Run Newtown, Pa. 18940	*EVA, EVA/480*	Full	256	132 by 44	9 by 14	640 by 350, 640 by 480	16	No	$525-$680
Vertlcom, Inc. 545 Weddell Drive Sunnyvale, Calif. 94089	*H-16, H-256*	Full	1.38M	80 by 25	8 by 14	1,024 by 768	16, 256	Yes	$2,995-$3,795
	CAD 480	Full	256	80 by 25	8 by 14	640 by 480	16	Yes	$695
Video-7, Inc. 550 Sycamore Drive Milpitas, Calif. 95035	*VEGA, VEGA Delux*	Half	256	80 by 25	8 by 14	640 by 350	16	No	$499-$599
Vutek Systems, Inc. 10855 Sorrento Valley Road San Diego, Calif. 92121	*EGA*	Full	256	80 by 25	8 by 14	640 by 350	16	No	$460

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available form the vendors.
CW chart compiled by Linda Gorgone.

The Businessland Technology Forum

NETWORKING

Networking, linking personal computers with peripherals and mainframes, has long been viewed as the most promising gateway to enhanced office productivity. A successful system must incorporate strategies covering network management, security, maintenance and planning.

To help you understand where networking is today and to provide you with a conceptual framework for evaluating its potential, Businessland is pleased to sponsor this Technology Forum. Former SRI Senior Consultant Terrence Cullinan has assembled four independent experts to contribute their perspectives on the subject.

Mr. Herbert D. Lechner, *Vice President for Information Systems and Administration at SRI International, opens with a discussion of the potential benefits of networking.*

Mr. Michael S. Allen, *Partner responsible for Corporate Strategy Consulting at Strategic Decisions Group, describes networks as a strategy to manage future office automation.*

Mr. Stevan Milunovic, *Director of Information Systems at SRI International, discusses the operational management of a network.*

Mr. Donn Parker, *Senior Management Consultant for Computer Security at SRI International, concludes by addressing developments in network security.*

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The Network as Sharer

A large retailer's executive functions were being done at stand-alone terminals with considerable duplication of effort and no ability to share meaningful data or interact with the organization's mainframe computer.

A needs analysis indicated that productivity would be sharply increased if accounting and forecasting data could be shared and if executive functions could communicate with each other in real time and across all areas. The analysis suggested electronic mail, shared financial spreadsheets, and mutually compatible word processing would yield highest results.

Thirty IBM Personal Computer XT's and IBM Personal Computer AT's were developed as workstations and servers with an IBM 3270 gateway connected to the mainframe host. As prospective users had no experience with the equipment, training was done prior to network installation. Installation took about three weeks and was done without interrupting ongoing functions. A service contract on the equipment was provided as part of the program.

Total installation cost was about $120,000, and provided each user with full PC functionality and access to the company's mainframe. Users now also have access to IBM Pageprinters as high end printers, and share through the server all tape back-up functions. The system has functioned for eight months with virtually no down time, has realized significant dollar savings and permitted the reassignment of five people to other departments.

Network Benefits

"As information systems technology becomes more pervasive, the potential for computer networks to enhance business productivity becomes even more significant. The role of management is to understand and evaluate the benefits of connectivity, provide overall direction, and to demonstrate leadership through personal use of electronic mail, information sharing and other network applications."

The installation of local area networks can result in the evolution of the "personal computer," from a small stand-alone resource to what might be called the "company computer," a workstation which can dip into and transmit information from individuals and systems in multiple locations. The overall benefits available to a company through networking its computers can include:

- *Shared resources.* Networks provide a fast, secure, convenient way for intradepartmental and interdepartmental data sharing. Network users may also share high performance peripherals such as laser printers, high capacity hard disks and dedicated servers for communications.
- *Faster communications.* Users of electronic mail have the opportunity to communicate ideas and information more rapidly and easily, communicating simultaneously with other network users.
- *Improved data accuracy.* Networks have the potential to eliminate the redundant entry of data, which is expensive, slow, and subject to error at each entry. With networking, data is entered once, and retrieval of information is available from a single, accurate data base.
- *Greater efficiency.* By transmitting data electronically, support staff and managers' time to manually transfer information is reduced, thereby enhancing productivity. In addition, time spent communicating via meetings, or by telephone, can be reduced with shared access to information through the network.
- *Reduced obsolescence.* Networking reduces the possibility of equipment obsolescence through its ability to tie older and newer equipment together via the network. This creates an opportunity for high utility of older equipment by providing access to the total resources of the network.
- *Improved computing management.* Networks make corporate computing manageable. Traditionally, computing in a company was planned and managed by controlling information system resources: the computers and the applications systems development groups. Personal computers have dispersed this system making it difficult to manage information in a cohesive central fashion. Networking now permits management to broaden the capability of each terminal user, and simultaneously reassert overall management of the information system, through the power of network connectivity.

In the not-too-distant future, voice and data will combine in all aspects of personal computer use. They will be integrated into "compound documents"—part voice and part data—and provide yet further benefits to networking.

Establishing an overall networking strategy today will improve a company's ability to take advantage of networking benefits available through these new technologies.

Mr. Herbert D. Lechner

Vice President for Information Systems and Administration
SRI International

Network Strategy

"Companies need an effective strategy today to manage the continuing explosion of hardware and software. Policies should focus on the right level of decentralization to gain control of assets without constraining the use of those assets."

In developing an effective office automation strategy, the vital first step is to free corporate management from a centralized data processing mentality. Applications of the future will provide significant productivity gains in controlled but widely distributed information management by networked computers. These applications include integration of text, voice, and images in a single document; electronic scheduling of people, facilities and equipment; and immediate access to outside data services through the network.

Key elements in developing an effective network management strategy are as follows:

- *Understanding organizational structure* to determine departmental information sources and needs.
- *Setting connectivity parameters* to guide individual network managers in selecting particular system elements.
- *Establishing good vendor relationships* to provide a full range of optional approaches to buying and installing networks.
- *Providing appropriate training* to insure the proper use and management of the network.

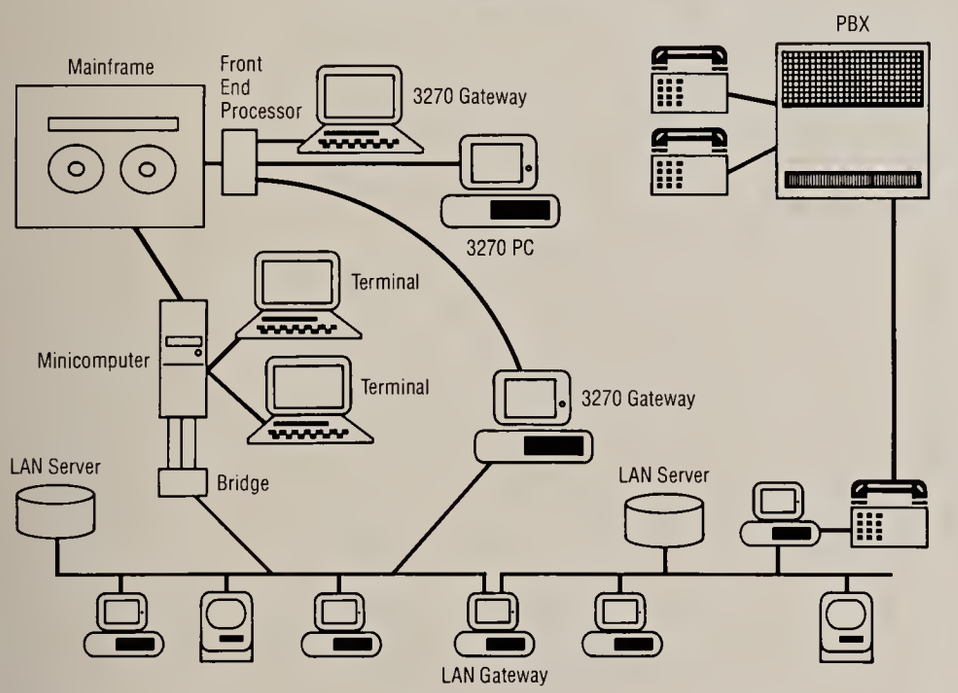
This strategic framework is applicable to companies investigating networking for the first time as well as firms that are expanding their own networks.

Mr. Michael S. Allen

Partner responsible for
Corporate Strategy Consulting
Strategic Decisions Group

Office of Tomorrow

In the office of the future, all electronic components will be connected, providing even greater productivity through new applications.



The Network as Integrator

A small organization providing layouts and lighting production for stage plays, trade shows, and other displays, was doing its accounting on an old IBM minicomputer and its layouts and staging plans on paper or on independent Apple Macintosh computers.

A small network was designed fitting the organization's budget constraints and providing for subsequent expansion at low cost when a new product came on line some months later. The initial network consisted of three workstations (two IBM Personal Computers, one Compaq Portable Computer). A 3Com 3Server (to be installed later) would link the organization's Macintosh computers into the system to provide shared design and layout capabilities.

Total installation costs for the network was $18,000, with the Macintosh connection subsequently to cost less than $2,000. It took seven weeks from commencement of analysis and planning to installation of the network. (Actual installation took two days.)

Where previously the organization did only part of its accounting on its old mini, the new system provided almost complete accounting functions as well as spread sheet processing, word processing, and project scheduling. Outside bookkeeping costs have been reduced 50%. Separate drawing and layout processes will be integrated into the system with the addition of the coming link capability.

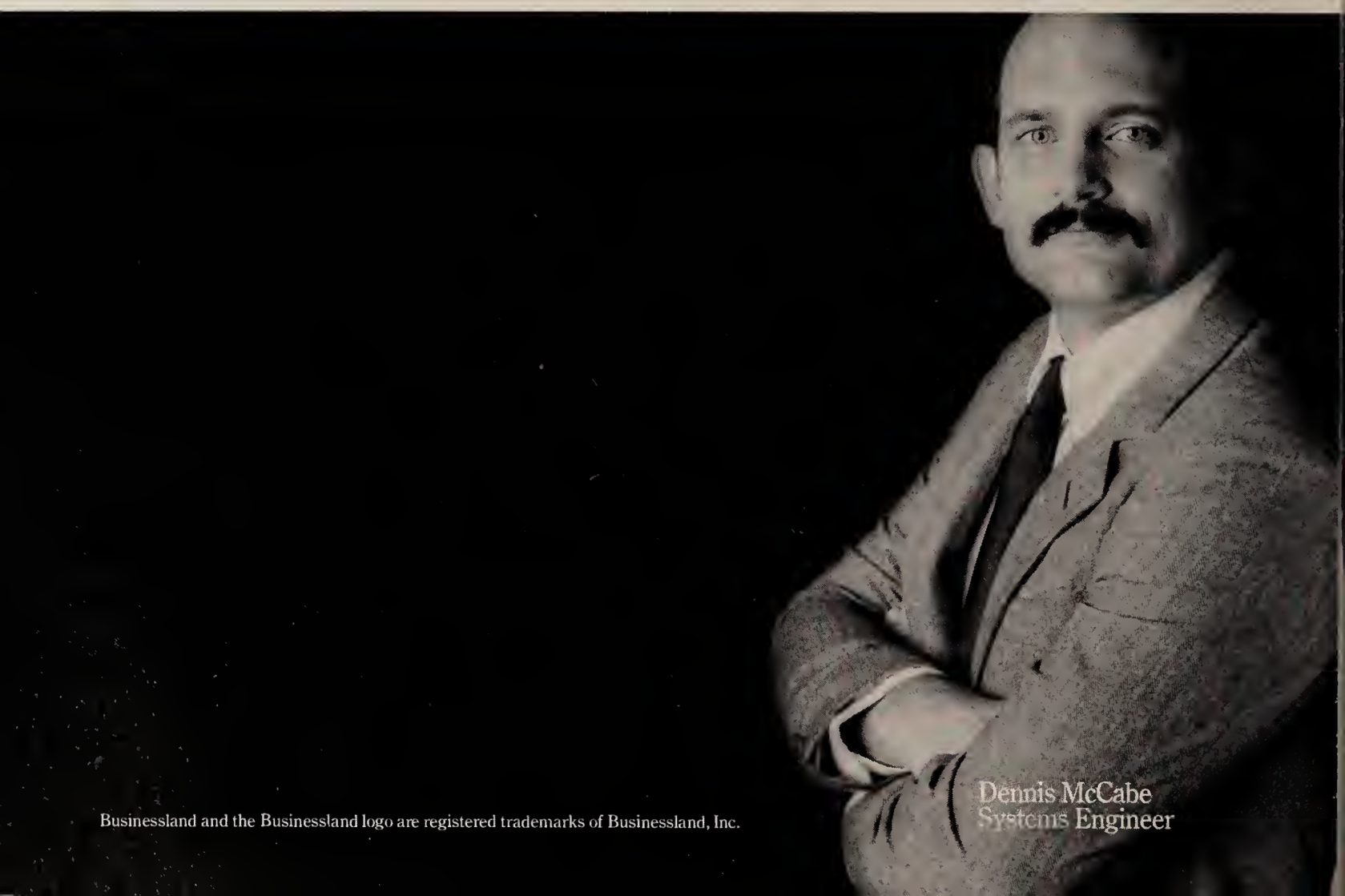
The Differe
Networking A

When you really sit down and analyze it, the critical element in a successful PC network isn't what you connect. It's who you connect with.

At Businessland®, that's a qualified systems engineer.

And our systems engineers are uniquely equipped to implement the best possible PC connectivity solution for any business environment. For one thing, they average 20 network installations in experience. They specialize in multi-vendor systems, having worked with major networking product vendors. They come, not with products, but with a business/solutions orientation. And an open mind.

The systems engineers don't make recommendations until they fully understand your way of doing business.



nce Between nd Notworking.

When they do, it's not a sales proposal. It's an objective, long-term plan based on your situation, their expertise, the best technology from the best vendors and Businessland's experience with over 1700 successful network installations, nationwide.

That's the beginning. Systems engineers stay involved in each project as a key team member, through installation, software set-up, training and service. They assure competence and continuity in every network.

The Businessland systems engineer is a real part of your networking solution from day one. It's a different way of working. And it works.

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A Different Kind of Computer Company

The Network as Communicator

A large utility's circuit planning organization was unable to share new circuit design ideas easily among its network engineers spread over several buildings in several geographic locations. Each professional was doing his or her own work on stand-alone machines.

A complete needs analysis showed that the ability to communicate interactively would greatly enhance response time to customers. Because of the complexity of operations involved, three separate local area networks were installed over 18 months (networks were chosen over minicomputers both because the network approach was more economical and because programs were available on microcomputers that were not available on mini's).

The resulting system involved 75 computers —mostly Compaq, and some IBM—all functioning as workstations; 3Com 3+ Route Software to link three servers in the three LANs; independent workstations at four remote locations using 3Com 3+ Remote Software, DBase III (with special applications), Lotus 1-2-3, WordStar, and six terminals using a mainframe connection through a 3270 gateway.

Total cost of the system was approximately $300,000, and the using organization—which has only had the network installed for a few weeks—is already reporting dramatic improvements in communications, significant enhancement to productivity, and a much greater organizational cohesion.

Network Management

"Skilled network management can be a major factor in encouraging profitable, effective use of networks. Careful attention to staffing and supporting the role of network administrator—covering service, training and support—will do much to deliver the promise of productivity inherent in networking."

A company's networking strategy will define the type of system capable of achieving productivity goals. This "framework" will guide department managers in their selection of computing equipment by setting clear standards. Ultimately, however, the long-term success of a networking system will depend on the talents of one or more individuals who are often called the "network administrators."

While the administrator's role may be full- or part-time depending on the size of the organization and its network, the type of person and the functions of the position will be similar. On one level, the administrator must develop a technical understanding of the system. On another level, however, the job calls for a person with strong interpersonal skills since there is the need to work closely within all levels of the company...from user to top management.

The corporate manager responsible for office operations will need to assist the administrator in understanding specific responsibilities that must be performed on a day-to-day basis. Some of these tasks may be delegated to outside vendors or internal assistants, but the administrator must feel accountable for the total success of the network. Each of the following represent part of that responsibility.

- *Data management.* The administrator will ensure that each network user has easy access to as much of the total data base as they require. Personnel changes require on-going attention to this duty.
- *Resource utilization.* At the same time, it is essential that all resources, ranging from software to peripherals, are shared as widely as possible. The administrator should actively monitor the performance of the network and look for underutilized network resources and make them more productive.
- *Software applications.* Upgrading existing software packages and introducing new applications require careful planning and may involve additional training.
- *Creation of back-up systems.* Policies and procedures must be established for saving, locating and protecting valuable data.
- *Training options.* Specific training programs on the proper use of the network need to be developed. Generally, changes in employee positions or system upgrades will trigger the need for training.
- *Data security.* Administrators for systems of any size, from a few PC's to very large networks, must be aware of their responsibilities regarding security.

Sound network management recognizes that the role of network administrator includes both present functioning and future structuring of the hardware and software throughout the organization. In this role, periodic executive reviews are recommended to help the organization get its hands around the computing function as a service, rather than a cost, to individual users and user groups.

Mr. Stevan Milunovic

Director of Information Systems
SRI International

Network Security

"We need to eliminate the concept of computer security and replace it with one of information security. Once this is accomplished, a strong security environment is achievable in any size network."

Most data available through a computer network is also available on paper—and most organizations have a larger problem with paper security than with computer security. The initial network security step for larger organizations will be to encourage the network security technologist and the industrial security officer to work together in applying logical, physical, and human security factors to the network. In smaller networks, these roles will fall to one or more executives and the network administrator.

Once this is accomplished, a wide-range of commercially-available products exist for electronic defense.

• ***Identify verification systems.*** These security precautions prevent access by unauthorized persons. They are based on what one "knows" (a password), "possesses" (a key), or, more recently, "is" (voice, fingerprints, dynamic signature, or other physical characteristics, although these are currently experimental and have some aesthetic, performance, cost, and hygienic problems). Automatic dial-back or port protection products reduce the number of telephones that can access a network.

• ***Security gateways.*** A single secure gateway to the network from the outside, to which adequate protection is provided, is becoming increasingly important as networks expand. This can be accomplished either by identity verification at that gateway (as described above) or by a mechanism called "cache memory" which will bring network data to the gateway for the inquirer thus negating the need to enter the system.

• ***Cryptography.*** The "scrambling" of data by one secret key and its "unscrambling" at the receiving point by use of an identical or related key—is the single most powerful defense against electronic eavesdropping on a network. However, "crypto" creates a security problem of its own, namely protecting the security of the key, and the host organization needs to understand the nature of key management.

Which system or combination of systems is best for a particular network varies by the total number of authorized users, the frequency with which system change is desirable, and the amount of manpower available to administer the security system. The cost of the security product is usually insignificant compared to system administration.

To help sort out the complexities in network security options, a new International Information Integrity Institute, known as I-4, is currently being established at SRI International to serve as a confidential clearinghouse. It is an annual fee service open to network security members from industry, academia, research, and vendor communities and covers all aspects of computer network security.

Mr. Donn Parker

Senior Management Consultant
for Computer Security
SRI International

Produced by: Delano, McLeod & Strausser, Inc.
Designed by: DeSantis Design Inc.
Written by: Terrence Cullinan

The Network as Engineer

A very large defense contractor wished to increase substantially the efficiency of its engineering activities. The challenge was to design a network which would permit sharing of hard disks and printers, a "chatting" capability, electronic mail, electronic document distribution, and provide the environment in which the engineers could develop their own personal applications.

After an initial installation of a small local area network of 14 PC's and one server, demand for the system was so high that a network has since been developed which includes over 200 PC's (mostly IBM Personal Computer AT's), 14 3Com 3 Servers, a totally integrated shared disk and printer capability, and two gateways to the organization's mainframe. Each gateway runs on a PC emulating an IBM 3274.

Cost of the network was about $250,000 to link mostly existing computers. The very technically qualified engineers who are primary network users are now sharing program developments on-line, communicating much more frequently and effectively, and continuously developing new personal applications and sharing them with other network members. The organization's activities are largely classified, but growth of the system has continued on a regular basis, indicating a high degree of satisfaction with results achieved.

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In Depth

The 'good idea' pool

Staff suggestions reap productivity gains

Employee ideas are an overlooked bonus for management
• Benefits: boost in revenue and morale
• Doing a good job is more than getting the right answer

By MARK DUNCAN

If data processing managers are not careful, they will waste, or at least overlook, one of the greatest resources they possess — the minds of their staffs and the infinite capacity of those minds for coming up with good ideas. In the context of this article, "good idea" translates to suggestion for productivity improvement.

Managers tend to recruit resources to fill specific needs, satisfy skill requirements or simply maintain head count. What they fail to realize is that in addition to the resource's fitting the requirement perfectly, there is always a bonus: The ideas that people have — indeed, cannot avoid having — while doing their normal jobs.

This oversight does not just occur at interview time but is a constant and potential danger in the ordinary working environment. Frequently, management is too absorbed in daily operations to interest itself in new, untried suggestions for alternative ways of doing things. What is required is recognition and respect for the idea process so that this valuable and infinite resource may be fruitfully tapped.

The DP environment is no better or worse than other environments when it comes to stimulating the minds of its work force. But an industry in which technology advances rapidly, thus necessitating the rapid development of human skills, is a naturally fertile area for the birth of good ideas.

With the introduction of a little formality into the process for accepting, evaluating and implementing suggestions for productivity improvement, management stands to reap substantial benefits in terms of both money and staff morale.

Establishing a vehicle

The steps for establishing a vehicle for handling productivity improvement suggestions fall into two groups: process implementation and active support of that process. However, the overall feasibility of the productivity improvement vehicle depends on the existence of the following critical success factors:

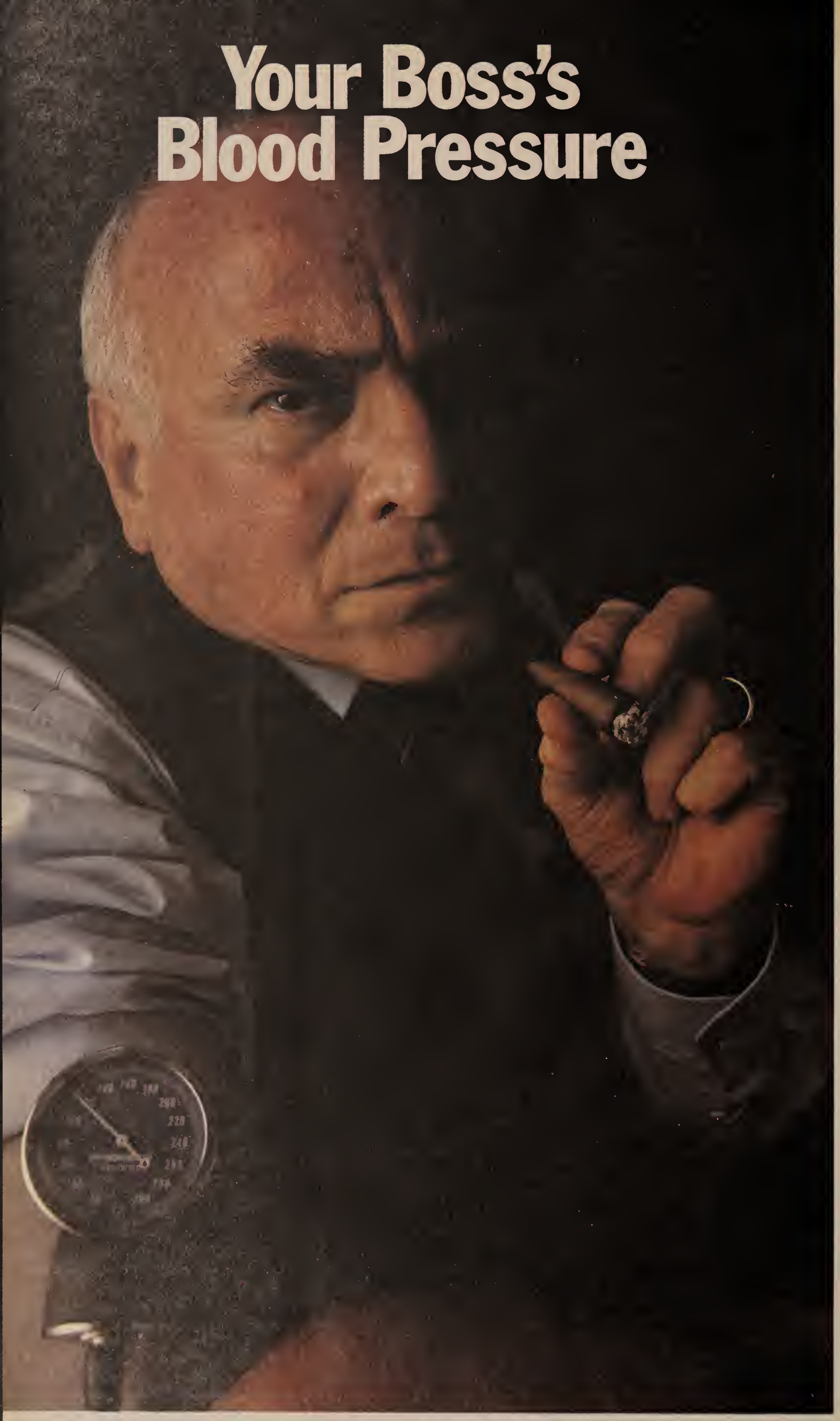
- A means exists for estimating and measuring productivity gain.
- Productivity improvement is a management issue.
- Idea development is openly encouraged.
- All staff are excellent "idea scouts."

Measuring productivity gain. At best, the expression "a good idea" is a subjective one. Often, it is intuitively easy to see the benefits or the productivity boost yielded by a good idea, but the only true way to support the concept is to quantify this improvement in terms of money and time saved. Tangible units such as these will support an idea once it is implemented, and the recognition that follows will encourage staff members toward further idea development.

However, intangible benefits, or at least benefits that are not readily quantifiable, should also be identified. User satisfaction, increased departmental credibility as well as improved staff morale fall into this category. For example, changing from a manual

ILLUSTRATION BY MARK STEELE

About the author
Duncan is a systems analyst in the quality assurance section of a major Dallas bank.



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You're the one they'll yell at if there's a security problem.

And come to think of it, where *did* you get that tie?

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work-reporting process to an automated one can not only simplify the task but can also improve the quality of the work being reported.

Productivity as a management issue. Productivity improvement demands commitment from all levels of employees, but the commitment will be more significant if it comes in from the top down. Lack of management interest will send a clear signal to lower staff levels that suggesting alternative methods and procedures is worthless because the suggestions will not receive any attention.

Although management may establish objectives related to improved productivity, front-line staff members are best suited to deriving ways of achieving those objectives. They are closer to the realities of the work processes, and although they may hold their own interests at heart when improving these work processes, they are nevertheless reassured by management's visible appreciation of their suggestions.

Idea development. Idea development should be openly encouraged. Here again, management plays a key role. It should acknowledge that although an idea may be born in a flash of inspiration, developing that idea to completion will take time. Failure to sanction that time will almost certainly be the death of the idea.

There are those who are conscientious enough to sacrifice their own time in pursuit of a potentially good idea, and in fact, this is an accepted expectation of senior-level staff. But to be totally fair-minded, management should formally allow time within work schedules for staff members who are otherwise occupied with production support and maintenance activities to develop ideas on productivity improvement. The best encouragement managers can provide is in the form of the time and means for employees not simply to perform the tasks listed in their job descriptions but to extend themselves and excel at those tasks.

Idea scouts. Peer encouragement among staff is also very important. Staff members must be mutually supportive of each others' ideas, offering encouragement and acting as sounding boards for each others' suggestions. Very often, development of a productivity improvement suggestion will require, for example, the formation of a partnership between a person skilled in business concepts and one who is a technical specialist.

Staff members must become versatile role players. When not working on their own ideas, they should endeavor to act as catalysts for others' ideas. The combination of management and peer encouragement will ensure a productive atmosphere for idea development.

Stalking ideas

Although a particular organizational unit (let's call it the productivity improvement group) may be responsible for productivity improvement in the applications development cycle, the whole staff must understand that all ideas are important, whether they are one's own or somebody else's. Furthermore, ideas are important at all stages of their existence, from the first tentative "I wonder if . . ." to final implementation or rejection of the idea.

This awareness must be honed into a skill that goes beyond observing and identifying a productivity improvement technique. Ideas should not just be fortuitously encountered. They must be stalked and hunted and played off other people without fear of ridicule.

Very often a person is too close to a situation to notice its possibilities for improvement in detail because of a long association with the situation in its present condition. Another person — an outsider — observing the situation objectively may be in a better position to evaluate the situation more closely and judge such criteria as logical sequence, timing, responsibilities and efficiency.

> ***The best encouragement managers can provide is in the form of the time and means for employees not simply to perform the tasks listed in their job descriptions but to extend themselves and excel at those tasks.***

Life cycle of an idea

The characteristics of a vehicle for handling productivity improvement suggestions are easily derived by examining the life cycle of an idea. Much like the human life cycle, ideas are born, grow and mature and may die.

Based on these phases, the process for handling suggestions for productivity improvement should incorporate formal methods for the following:

- Submitting the suggestion for productivity improvement.
- Developing and testing the suggestion.
- Evaluating the suggestion.
- Implementing the suggestion.

Any productivity improvement suggestion is eligible for formal submission. It may be purely theoretical, or it may be developed. A theoretical idea is, in practice, an untried one, but one for which there is enough evidence to suggest that it may

return benefits. Evidence in these circumstances may amount to nothing more than the professional judgment of one or more staff members who may be affected by the suggestion.

A developed productivity improvement suggestion, whether partial or complete, is one that is simple enough to put into practice without incurring excessive costs. It may also be an idea that sounds implausible, and the only way to test its feasibility is to do it; but even in the latter case, the expense should not jeopardize project budgets.

Having been classified, the suggestion needs to be documented and submitted. A simple form should be developed that allows the suggestion to be outlined, any development costs to be estimated and potential benefits to be listed.

The productivity improvement group, as the recipient of the suggestion, should respond to it in a timely manner. The response should address requests for resources; identify other related suggestions, active or otherwise; and include any comments that the group can make based on experience.

Development and testing

Barring any major impediments, the productivity improvement suggestion moves into the development and testing phase, during which its scope as a tool will be more firmly defined, and the documentation and potential benefits will be expanded.

When development is complete, the tool must be subjected to formal testing. Although this may be on a limited basis, it must be as authentic as possible. Testing will enable flaws in the suggestion to be removed and allow preparation for implementation.

Ideally, a selected group of participants will test automated and manual tools in parallel with current methods. Test results, favorable and unfavorable, must be thoroughly documented and submitted to the next phase.

The purpose of evaluation is to make a final decision on whether the productivity improvement tool is worth implementing. The test results are the main input to this phase, although interviews with the test participants and prospective users of the tool may also furnish valuable information that is otherwise difficult to document.

Approval authority for the productivity improvement tool will naturally rest with the managers of the area most affected, but they will necessarily rely heavily on the recommendations of their staff and the productivity improvement group. The conditions for accepting a productivity improvement tool may rest on further testing for more specific results or on satisfactory completion of a probationary period.

Implementation and improvement

Once approved, a productivity improvement tool must be promptly implemented or at least scheduled for implementation if timing considerations are significant. An improvement tool may be optional, or, if the benefits are significant enough, it may become a mandatory standard or procedure.

In either case, the tool must be publicized via appropriate channels, and, if necessary, training in its use must also be provided. Ongoing monitoring of an implemented tool will ensure the tool does not outlive its usefulness.

Perhaps a periodic questionnaire can provide an indication of a tool's acceptance and frequency of use. If the productivity improvement is some sort of automated tool, data on its frequency of use can be automatically logged.

The following are examples of possible productivity improvement tools.

Data extraction/generation. Testing new programs and retesting them in a maintenance context are common enough activities in any DP department. An essential associated task is creating test data.

This task is so routine that most programmers will write their own job control language (JCL) or a one-time-only program to extract or generate test data from production files. When more data is required or different files used, the extraction/generation task is repeated with a slightly modified JCL. The result is a department full of programmers, each with very similar, but nevertheless different, versions of JCL for extracting or generating test data.

A good productivity improvement tool in this area would be a utility, either developed or purchased, to simplify test data creation from production files. Input to the utility would be the file characteristics (file name, record length, data organization and so on) and record selection criteria (range of values of key fields, number of records, editing rules to change some fields on output and so on). Access to the utility could be facilitated via a simple data entry panel, which would also perform basic editing on the test data creation requests.

Benefits provided by this productivity improvement include the following:

- A standard, uniform method for test data creation that is easier to use.
- Reduction in the number of individual programs and JCL members programmers must maintain.
- Elimination of duplicated effort each time test data is required.
- Elimination of errors (and repeated errors) when test data creation is undertaken separately by individuals.

Interactive syntax checker. Clean-compiling new programs generally takes from two to four compilation runs to remove syntax errors. Program compilation is still predominantly a batch process, even though

Productivity ideals

The following principles will not guarantee productivity improvement, but they will foster an environment conducive to the generation of good ideas.

- Every suggestion is worth considering.
- An idea is important at all stages of its existence, from the first "I wonder if . . ." to implementation or rejection.
- Ideas for productivity improvement need to be encouraged and rewarded.
- Managers must be men of vision when it comes to productivity improvement. They should appreciate that there is more to life than routine production support and budgeting.
- Managers should exercise a healthy receptiveness toward suggestions for improvement. Failure to do so may encourage staff to take their ideas elsewhere.
- Staff members should maintain firm determination in supporting the submission, development and evaluation of their ideas, but they must accept with professional grace evidence that proves the ideas to be unfeasible or impractical.
- Managers and staff should be fanatic about quality and efficiency. They should show an uncompromising unwillingness to strive for anything less than perfection.
- Management and staff should develop a keen awareness of the types of environment conducive to idea generation and those that are hostile. They must nurture the former and avoid the latter.
- While striving to fulfill personal ambitions, management and staff should not lose sight of the fact that jointly they are responsible for achieving the more global objective of company success.
- Peer respect and support for suggestions is important at all organizational levels.

— MARK DUNCAN

it may be initiated interactively from a terminal. The programmer must wait until the job — one of many in a priority-driven queue — runs, and the output is removed and separated from other jobs and then distributed or left for collection at a designated location.

Interactive syntax checkers can significantly reduce the time to clean-compile a program. This software enables programs to be compiled and the results examined at a terminal almost immediately. Errors in the source may be corrected on-line interactively, and further compilations may be submitted. A batch compile that produces the hard-copy listing needs to be submitted only when all errors have been removed or when the programmer judges that the next run will produce a clean compilation.

Interactive syntax checkers reduce overall time for a clean program compilation. In addition, paper use and output handling are reduced, since hard copy has to be produced only when it is error-free, so the operations staff separates and distributes less output.

Finally, the syntax checkers promote an efficient working style. Programmer concentration is improved because the clean-compilation process is not broken up by job turnaround cycle.

On-line standards. Standards governing the applications development process are generally maintained as hard-copy manuals. Whether this amounts to one manual or a shelfful, the problems are predictable: The manuals are difficult to keep current, they are costly to print and distribute, it is difficult to ensure that all updates are applied when received and so on.

Putting standards on-line resolves most of these problems. On-line access to standards is easier and more dynamic; the standards can be referenced from the terminal where a programmer is working. In addition, automation permits key word access rather than chapter and verse reference. Updates are disseminated to all standards users instantly so they are always current, printing and distribution costs are eliminated and personnel freed from the burden of manual updates.

Active support of the process

No process for handling productivity improvement suggestions can be self-supporting. Once implemented, the process should be actively maintained by instituting the following:

- A known repository for accepted, implemented productivity improvement tools. A tool that becomes a standard will reside in the normal repository for standards. Those tools that are recommended but remain optional should be housed centrally and be accessible in a standard fashion.

Procedural productivity improvement tools must be documented in one manual. Automated productivity improvement tools must exist in one load library, the allocation of which is automatic to interactive computer users. Easy access to the productivity improvement repositories is a key feature that will encourage use of these tools.

- A directory of available productivity improvement tools that can be accessed both on-line and in hard copy. A comprehensive directory

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will further facilitate accessibility to the tool repositories. The directory may be referenced by tool name or tool function and will include examples of tool use and basic instructions for the tools.

• A regular survey of productivity improvement tools, both those that are implemented and those that are documented but optional. Productivity improvement is a self-perpetuating activity. The fact that a productivity improvement suggestion is implemented does not mean that the particular process it addresses cannot be improved further. On the contrary, by having attention drawn to it and through constant scrutiny, the process inevitably becomes a candidate for further improvement.

• A reward program for implemented productivity improvement suggestions. Although a reward should not be the only motivation, it can certainly be a strong one. It is an accepted facet of human nature that people like to be praised or thanked for their efforts via a reward.

The actual reward may take many forms: a personal letter or a verbal pat on the back from the company president, a name listed in an internal newsletter, a gift, a bonus, time off from work and so on.

But whatever the reward, one thing is certain: Withholding recognition for productivity improvement suggestions will be the single most destructive factor to the overall submission process.

To formalize an activity that is as natural as having ideas may seem cumbersome — but people are adaptable. If the formal process is implemented sensibly and sensitively, then what initially appears to be restricting or artificial will in time become second nature.

A cursory investigation in any organization will probably reveal that staff members are already using quicker and better ways of doing things in the course of their work. If time and money are being saved by isolated individuals using productivity improvement tools, how much more could be saved if these tools were available throughout the department?

Twofold benefits

The benefits of formalizing the productivity improvement suggestion process are twofold. From an organizational point of view, it is a way of capitalizing on those abilities of staff that would otherwise remain dormant in the normal course of work. From an employee point of view, it is a way of obtaining work-related recognition as well as having the satisfaction of developing one's own ideas.

Because productivity improvement is an issue that is uppermost in the minds of DP managers, doing a good job should mean more than simply getting the right answer — it should mean getting the right answer by applying the best methods. And the only way of ensuring that one has the best methods is by regular scrutiny — an unwillingness to accept that something cannot be improved and a healthy receptiveness to productivity improvement suggestions.

Creativity is an innate human characteristic, and like any other, it may easily be stifled. However, in an environment that encourages and rewards it, suggestions for productivity improvement will come thick and fast. Within any organization, good ideas are not only free, they are limitless in quantity. If nothing else, it makes sound business sense to tap this natural and infinite resource. ■

> ***"The only way of ensuring that one has the best methods is by regular scrutiny — an unwillingness to accept that something cannot be improved and a healthy receptiveness to productivity improvement suggestions."***

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In Depth

Teleconferencing outlasts skepticism

Meeting by computer works in a well-defined niche • Permanent vs. portable installations • How to overcome audio problems

By RAYMOND PANKO

Teleconferencing has gone through several promotion and bust cycles since the mid-1960s. Information systems planners are understandably wary of making the heavy investments needed to create audio and video teleconferencing systems, given this poor track record.

The sad thing is that we have known for years when teleconferencing works and when it probably does not work. Simply put, teleconferencing works when you have a group of people who meet very frequently and find travel burdensome.

This was the conclusion of a study completed at Stanford Research Institute, now SRI International, Inc., during the mid-1970s for the National Science Foundation, a study in which I took part. The conclusion seems to be holding today just as well as it did then.

While questionnaire and laboratory research indicates that half of all business meetings could be replaced by teleconferencing, that is not what we see in practice. Although business teleconferencing may have a larger role to play in corporations in the future, it has to begin, at least, as a service for well-defined niche markets.

In our 1975 study, we had the luxury of examining virtually every teleconferencing system in operation and many of those that had operated for a while and failed. In every successful case, the same pattern emerged. There was a group of people who needed to meet so frequently that travel was either tiresome or out of the question.

The Bank of America National Trust and Savings Association offers a good example of this basic pattern. Beginning in the 1950s, experiments in audio-only, room-to-room teleconferencing began at the Bank of America in California.

Life at the bank

For business reasons, the bank split its senior officers between Los Angeles and San Francisco. Several of the bank's major executive-level committees met weekly or biweekly, so most officers found themselves traveling two or three days a week. Not only was this exhausting, but it raised the specter of losing half the bank's senior management in a single plane crash.

The bank began to experiment with audio teleconferencing to hold routine executive meetings. While the early technology was extremely crude, the officers were willing to put up with it because of the obvious benefits.

By the mid-1970s, the bank's audio teleconferencing technology became extremely sophisticated. The executive suites in both Los Angeles and San Francisco boasted board rooms with audio conferencing equipment, and the bank's executive-level committees regularly held their meetings via audio. This system remains in use and forms an integral part of executive life at the bank.

The National Aeronautics and Space Administration is another case in point. Major projects carried out by NASA have frequent design review meetings that involve literally hundreds of people in different locations. Travel would waste so much in the way of travel and manpower resources that teleconferencing held the only solution. Ever since the Apollo launches, NASA convened all routine design review meetings on-line for major projects.

Pattern for success

These are just two examples of the general pattern. Every other teleconferencing system that has been successful over the long term has shown the same pattern of frequent meetings and heavy travel requirements.

We can speculate on why this pattern marks successful systems and why the lack of these specific conditions makes teleconferencing projects fail. For one thing, solo travel is not as inefficient as many people have argued. Research shows that when people travel, they go on trips lasting several days and have several meetings each day. Given these statistics, the actual cost per meeting is not necessarily all that high.

Second, not all employees will be open to

ILLUSTRATION BY CHRIS DEMAREST

About the author

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eliminating or reducing travel. Occasional travelers find travel a side benefit of their jobs and do not really want to lessen it.

It is only those people who seem to spend their lives on airplanes who seek to cut down on traveling. The fact that these same people meet frequently means that they will have the incentive to do the work needed to get access to an existing system and to work through the initial teleconferencing meetings.

Procedurally, using many teleconferencing systems still involves a good deal of red tape, so initial meetings are often somewhat chaotic as the people involved learn such basic discipline as giving their names before they talk.

This basic pattern has important implications for information systems planners. If a teleconferencing system is being considered, research should focus on identifying committees and other work groups that have to meet frequently.

Procedurally, using many teleconferencing systems still involves a good deal of red tape, so initial meetings are often somewhat chaotic as the people involved learn such basic discipline as giving their names before they talk.

Pattern suggests marketing tactics

In general, these meetings are likely to represent only about 5% of all travel meetings, and if that represents too few meetings to justify a system, a very cautious analysis should be done on potential benefits. While it may be possible through shrewd internal marketing to justify purchases beyond the core market, this type of expansion has failed so often that it is not a good assumption for decision making.

The basic pattern also suggests how to market the new system to senior management. Instead of doing scattershot promotion, the teleconferencing team should base its work on the needs of one or two distinct groups that will use the equipment frequently.

The team should involve these groups in plans from the beginning, so when the system initially arrives, the groups will be interested in the project and be willing to put up with some technical problems.

Selecting a technology

If the prospects for teleconferencing do seem promising, the next step is to select a technology. The most common choices will include the following:

- Telephone conferencing.
- Portable audio conferencing.
- Permanent audio conferencing.
- Limited image conferencing.
- Permanent video conferencing.
- Portable video conferencing.

Telephone conferencing is the easiest way to link several people in different areas because there is no need to change anyone's office equipment. The only piece of technology needed is a bridge that several people can call into. This bridge effectively puts everyone on a single party line. Many private branch exchanges do this on a limited basis by allowing three or four phones to be linked together, but some more sophisticated telephone conferencing bridges can link a dozen or more lines simultaneously.

Bridging sounds simple, and so it is. But selecting bridging equipment harbors some challenges. First, because phone lines vary in quality, the bridge must be able to match sound levels on different lines, and it must be able to do this automatically.

Second, bridges vary considerably in the ease with which they let users set up conference calls. Since typical bridge users have not made a huge commitment to the project, it is unrealistic to expect them to submit to rigorous training sessions before they can hold a single teleconference.

Although telephone conferencing can use ordinary office telephones, long meetings tend to be physically uncomfortable because participants must hold the telephone receiver up to their ears and mouths the entire time. So if users will be engaging in many long meetings, they may want to buy better equipment.

The simplest thing to add is a headset, such as those used by telephone operators. Headsets allow comfortable, hands-free operation, and they provide good sound quality. They cost less than $100 apiece.

For somewhat greater cost, telephone conferencing participants can buy loudspeaker telephones. These do not require the user to be restricted by a cord. Unfortunately, these units often demonstrate poor sound quality, and unless the user has a private office and a closed door, this kind of equipment tends to irk the user's office neighbors.

Conferencing equipment

Telephone conferencing is normally limited to a single person at each telephone. But in many cases, several people at one site need to talk with several people at another site. This can be done most simply with portable audio conferencing equipment.

A portable system consists of one or two speaker phones plus directional microphones and wiring to connect the equipment. A good

A vendor's view: How you can avoid meetings forever

Chat with colleagues by E-mail instead of waiting by the phone

By KATE HEDGES

In thinking about telecommunications lately, I hit upon a bit of nostalgia that I could not get off my mind: the old TV show, "Lassie." In the small town where Lassie lived, there was a telephone operator who knew exactly where everyone was at any given moment.

All you had to do was pick up the phone and ask this wizard of telecommunications where "my little boy Timmy" is, and she would tell you that he is at the pond, fishing. Couldn't get through to the country store to cancel that 10-pound sack of potatoes you ordered yesterday? The good operator would tell you that she could see Mr. Grocer from her window, and she would give him the message.

Today, things are not so simple. We not only need to communicate with Mr. Grocer across the street, but Herr Grocer in Germany and Senor Grocer in Spain. And that sack of potatoes is not small potatoes anymore. Today there are an estimated 20 million personal computers sitting on desks throughout the world, and their population is expected to triple by 1990.

Electronic mail has been touted by industry pundits as having an explosive impact on our everyday manner of communicating. Yet, no major player in the business is sending its shareholders to Tahiti from E-mail profits. And why not? There are simply not enough electronic messages and documents pumping through the networks. Vendors are reasonably adept at selling electronic mailboxes, but they are lousy at selling E-mail.

For users, old habits are hard to break. What is a seemingly obvious way to get a message to someone may not be the most economical or the easiest. Take the telephone as an example. What at first appears to be a simple telephone call overseas may in fact wrap you up in one of the most expensive communications game in town: telephone tag. Recent AT&T statistics show that 35% of all business calls are incomplete, resulting in telephone tag.

Pricey telephone tag

Now let's play some international telephone tag. Kate calls Klaus in Munich. At $1.94 per minute, she will spend $5.82 before she even reaches Klaus on the fourth attempt. Klaus will spend $13.10 trying to call her back.

If Klaus reaches Kate first, and they talk for the average length of a telephone call (4.8 minutes), it costs an additional $18.10. After all, do you really have the gall to say, "Your plan is approved" and hang up without inquiring about Klaus's well being and Munich's weather?

To get their plan approved, Kate and Klaus have just spent $37.02. Even the most expensive E-mail network could have done the same job for less than $2.00. And that's not all. With a time difference of six hours, Kate and Klaus have a maximum of 10 business hours a week when they are both in the office. If Klaus happens to work in Tokyo, they have zero hours a day.

In short, speech is an uneconomical and inconvenient medium for international communications. Courier services and international travel cost even more and raise the problems of document rekeying and jet lag respectively. But if E-mail is such a cost- and time-effective alternative, then why are Kate and Klaus not using it?

One reason is that Kate and Klaus do not know how, and no one has bothered to tell them. When Kate asks her MIS department for help, the response might be, "We will be implementing IBM Professional Office System real soon now, so sit tight," or "We recommend waiting for the dust to settle on the Integrated Services Digital Network and CCITT X.400 implementations before any decisions are made."

Another reason Kate and Klaus are not using E-mail is that they are human. Instinctively we all resist the new and the unknown. Although many of us have personal computers on our desks, and we know there are networks that could connect us, we have endless doubts: "There are no courses offered by the corporate PC resource center," "Who has the time?" and "It all sounds very complicated, anyway."

> ***From here we glean the first rule of E-mail physics. The speed of E-mail acceptance is directly proportional to the seniority of its corporate champions.***

If Kate and Klaus are E-mail savvy, we will have a whole different set of doubts. "Every time I want to E-mail with someone, they are not on my network. Even if they were, how am I supposed to know their E-mail address? There are no directories. Until someone solves the gateway and addressing problems, it's not worth it."

It is a zero-sum game, and everyone is a loser. The business community loses because it is not using available technology to maximize profitability. Because businesses are not making use of the technology, the vendors are not meeting their original return-on-investment projections — witness the Federal Express Corp. Zapmail bailout. For the vendors tough enough to stick it out, research and development investments in enhancing the networks will have to wait.

In the meantime, Kate and Klaus still need an inexpensive and fast way to communicate. They are still spending thousands of dollars on phone calls, courier services and plane trips. The question remains: How do we get Kate and Klaus to overcome the obstacles to using their personal computers to communicate?

The first thing to do is to let Kate and Klaus know about the existing resource they can use today — telex.

Telex? Isn't telex dead? Isn't telex old, expensive, easily surpassed in every technical characteristic by just about anything? Does *anyone* use telex anymore?

Paradoxically, the technology that is at the heart of telex is a potent engine for the growth of E-mail. What telex offers is not just access to another telex machine in a tool factory in Frankfurt, but rather a network that already stretches across the street and around the globe.

Because it's there

Why should anyone want to connect a state-of-the-art personal computer to an old-fashioned 50 bit/sec. network? Because, like Mt. Everest, it exists, and it works. Telex is a wide-area network, and it is in place today.

Let's go back to Kate and Klaus. Now that they know they can use the telex network to communicate from one PC to another, they no longer have a gateway problem. Kate makes a local or toll-free call via a modem to one of the telex carriers and transmits her message to Klaus's telex address.

The carrier's switch recognizes the address as one of those assigned to a personal computer, rather than a telex terminal, and manipulates the file accordingly, depositing it in Klaus's telex mailbox. Klaus then dials up his mailbox and downloads the file Kate sent. One telex switch may send to another at 50 bit/sec., but to Kate and Klaus, the recoding and the transmission speed adjustments are transparent.

They can easily look up numbers in directories such as Jaeger and Waldman's (distributed by Universal Media, Bethpage, N.Y.) with 1.8 million E-mail telex addresses. Corporate America need not make any additional capital investment in hardware or lines while waiting for the Integrated Services Digital Network dust to settle. And Kate and Klaus can use E-mail today to their hearts' content.

But remember, just because we have overcome some of the immediate stumbling blocks, Kate and Klaus are still human, and it still does not mean they will use E-mail.

From here we glean the first rule of E-mail physics. The speed of E-mail acceptance is directly proportional to the seniority of its corporate champions. If you don't use E-mail, you can bet your bottom dollar that Kate and Klaus won't either.

Once Kate and Klaus are committed, they will want to learn more. They look through the information their company has given them about enhancing their usage of personal computers to improve their productivity.

Then perhaps someday, the curricula for PC resource centers, trade shows and seminars will read like this: "Turn your desk into a 747 and see the world" . . . "E-mail: Don't leave home without it" . . . "E-mail Lotto — You gotta be in it to win it." ■

Hedges is director of sales and marketing for IBCS USA, Inc., the Greenwich, Conn., vendor of the IBCS Network.

system can be set up or broken down in less than 15 minutes, and it can be stored away out of sight when not in use.

Portable units vary somewhat in cost, and they vary even more in audio quality. They are inexpensive enough, however, to scatter around the corporation, so that users should not have to walk very far to get to a suitably equipped room. They can also be used, with a teleconferencing bridge, to link more than two sites.

Permanent audio conferencing requires that equipment be installed in selected rooms. Installation is expensive, and only a few rooms will be equipped, possibly requiring users to walk some distance to use the facility. Sound quality, however, can be much better in a permanently equipped room; so for intense use, this type of installation makes a great deal of sense.

Limited vs. first-class visuals

Limited image conferencing adds images to audio communications. These images fall far short of those produced by full-motion television, but limited images can be transmitted over ordinary telephone lines instead of expensive television lines.

One form of limited image conferencing is slow-scan television, which effectively takes television snapshots of the room and its occupants and sends these to the other conferees over a period of several seconds. The other conferees see a series of stills from the other location. Slow-scan television provides some feeling of presence, but unfortunately the snapshots often catch people in grimaces. Slow-scan television can be put to better use handling graphics, which remain static.

For graphics, however, there are several other possibilities. One is to dispense with views of people entirely and to exchange graphic images by other means. Electronic blackboards, for example, allow users to show images and annotate them in real time. Facsimile makes use of technology that is familiar and possibly already in place.

Whether users turn to slow-scan television, electronic blackboards or facsimile for limited images, they must provide two telephone lines to each room. One will channel the audio traffic, the other the image traffic. Because it takes several seconds

EXECUTIVE REPORTS

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to several minutes to move a detailed graphic image, voice and image cannot share a line.

In full-motion video teleconferencing, television cameras at both ends send complete images in real time. Normally, video conferences require an operator to set up cameras and handle other minor chores.

In the past, the only alternative was to create a permanent video conferencing facility. These systems have typically cost $500,000 or more per room.

Now, cheaper portable video conferencing systems are on the market, and at the same time, the equipment costs for permanent rooms are beginning to fall.

The audio problem

No matter what technology a company chooses, the most predictable technical problem will be audio. Nearly every conferencing system puts users through some problems with sound quality. Even in video conferencing, sound quality remains the most vexing problem encountered in most systems.

The problem stems from sound producing the same wavelength as common objects in the room. Thus, when sound waves emerge from the speaker, they tend to reflect back into the microphones.

The system then amplifies the sound again and sends it back out, where it is again picked up by the microphones. This feedback cycle, repeated several times, produces the ear-piercing screech familiar in high school auditoriums.

If installers do not acoustically treat the room with sound-absorbent materials on walls, it will take drastic measures to control feedback.

One such technique embodied in some audio equipment, called voice clipping, shuts off microphones when the other side is talking. Unfortunately, voice clipping usually cuts off the first word when someone begins talking, creating unpleasant interactions.

If a moderate effort is made to treat the room, however, and if users buy directional microphones, good sound quality should be attainable.

If the audio equipment allows the room to be "voiced," knocking down specific frequencies where feedback occurs, users can create an even better shirtsleeve environment.

Video conferencing

Although video conferencing is the most expensive form of teleconferencing, companies almost always

> ***No matter what technology a company chooses, the most predictable technical problem will be audio. Nearly every conferencing system puts users through some problems with sound quality. Even in video conferencing, sound quality remains the most vexing problem encountered in most systems.***

consider it seriously because of the attractiveness of seeing full-motion video.

To make an informed choice, consider the full cost of offering video teleconferencing in a permanent facility.

Costs and requirements

The first cost a user company must face is room modifications, including the acoustical treatment mentioned above. In permanent installations, the room will have to be ripped up to install recessed equipment and wiring. An operator's booth will also be needed to keep the operator visually and mentally out of the picture.

Permanent rooms also need a receptionist's desk for the person who will handle room reservations. This person cannot double as the operator, since to be cost-justifiable, the room will be used enough to keep the operator away from the telephone for long periods of time.

Second, the company must purchase audio and video equipment including cameras, speakers, microphones, wiring and a control panel. Aside from equipment costs, installation costs will also be considerable because installers must perform a number of tests to ensure correct lighting and other conditions.

Third, companies must anticipate the cost of transmission lines. Full-motion television normally uses 6-MHz transmission lines, and these are very costly.

To reduce costs, many video conferencing systems are now designed to rely on less expensive T1 transmission lines. These digital lines push speeds up to 1.544M bit/sec. in the U.S. and 2.048M bit/sec. in many other parts of the world.

Because T1 lines are digital, however, each of the video conferencing rooms needs an extra piece of equipment: a coder/decoder, which is the counterpart of a modem. Modems send digital signals over analog telephone lines.

> ***As far as we can tell, a really successful teleconferencing system is probably a sign that corporate operations are so artificially split that reorganization is necessary. Most of the systems that died were pulled out after major reorganizations.***

Coder/decoders

In contrast, coder/decoders translate analog television signals over the digital transmission lines supplied by the telephone companies for high-speed, long-distance service. Competition has driven down the cost of T1 lines and the cost of compressing coder/decoders in recent years.

Fourth, installers must run lines through the user's building, and microwave or satellite dishes may be needed to get the signal to and from the common carrier. Laying these lines and buying the termination equipment can be extremely expensive.

Finally, the user company must face significant personnel costs. As noted earlier, a receptionist will schedule the room, sign people in and handle other clerical details such as billing.

A separate operator will switch between camera angles, adjust sound levels and do various other tasks. This operator must have the technical competence to handle minor repairs and do maintenance on the room.

Normally, the operator is required full time, both because of the number of conferences held on these facilities and also because of the maintenance work needed during nonuse periods.

The long run

First and foremost, teleconferencing works when you have a group of people who meet constantly and find travel burdensome. If you do not start with this kind of need, it is very difficult to launch a teleconferencing service.

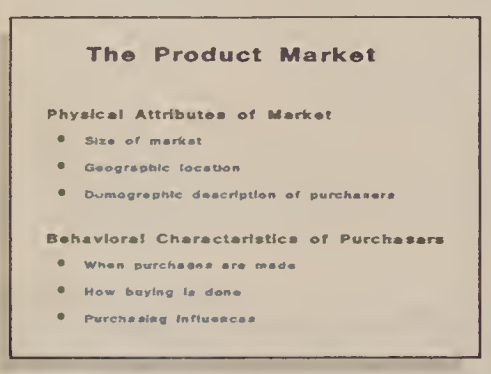
For the longer run, however, it seems that once a teleconferencing system gets established as a normal part of corporate life, use begins to spread.

At the Bank of America, for example, use has broadened from audio conferencing to video conferencing, and many teleconferencing meetings are now held by groups that meet only once or twice.

At the same time, if you do find high initial demand from certain heavy-travel groups, this may not necessarily signal a fertile ground for introducing teleconferencing. One disturbing result from the Stanford Research Institute study was that nearly every teleconferencing system that had been publicized as an outstanding success died within a few years.

The reason? As far as we can tell, a really successful teleconferencing system is probably a sign that corporate operations are so artificially split that reorganization is necessary. Most of the systems that died were pulled out after major reorganizations.

Planners for teleconferencing need to consider how the company is likely to be organized tomorrow, not just how it is organized today. ■



Sign-Master by Decision Resources

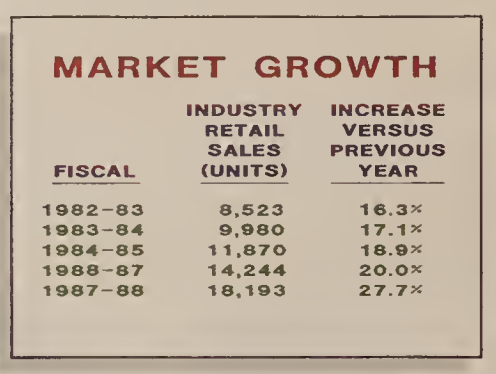
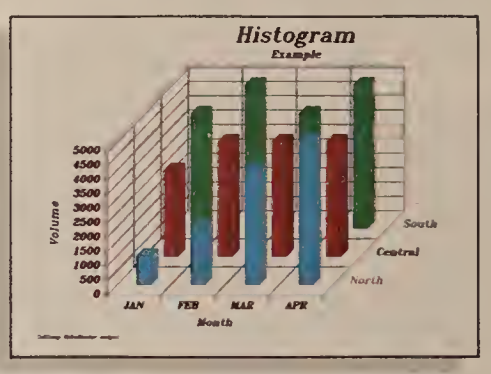
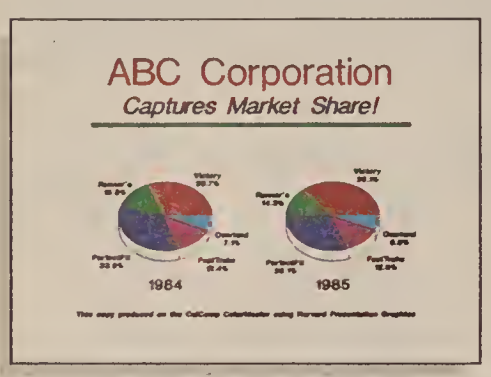


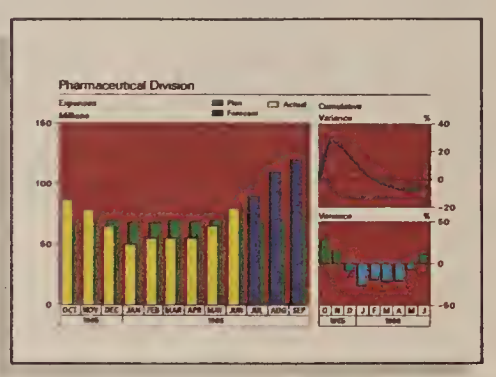
Diagram-Master by Decision Resources



The Smart Series by Innovative Software



Harvard Presentation Graphics by Software Publishing



LINK-A-GRAPH by ISSCO

Mirage by Zenographics

MANAGEMENT

TAKING CHARGE
J. Daniel Couger

E pluribus computum

FIRST OF TWO PARTS

Although computers have spread into every corner of organizations and people have become more knowledgeable and enthusiastic about them, many of their promises remain unfulfilled.

End-user computing, which enables users to develop their own applications, has the greatest potential impact of any development in the computer field. But for many organizations it has been far less effective and more costly than anticipated. Others have had good results. Despite the varied experiences, end-user computing is proliferating. Computing is now available for all. But at what price?

When studying end-user computing in 17 large companies with strong MIS operation experience, I found 11 had serious problems. However, the other six enjoyed high returns on their investment, proving managers can overcome the obstacles.

The 11 troubled companies showed ominous symptoms from the start. Four of them laid out large sums for end-user computing services before they had even drawn up separate budgets for it.

See **E PLURIBUS** page 78

Couger is a Distinguished Professor of Computer and Management Science at the University of Colorado, Colorado Springs. Reprinted by permission of the Harvard Business Review. *Excerpts from* E pluribus computum *by J. Daniel Couger (September/October 1986).*

Systems aid liquor sales

Decision support systems tighten distribution process

By Alan Alper

NEW YORK — Tracking customers' inventories and controlling distribution costs are among the marketing tasks being tackled with decision support systems, according to marketing managers for two leading liquor firms.

With consumption of alcoholic beverages in the U.S. declining, decision support systems have played a vital role in keeping distilleries riding high, according to Neil Kelliher, vice-president of vodka marketing at Heublein, Inc. in Farmington, Conn., who took part in an Oct. 30 panel discussion titled "New Support for Decision Makers" at the Conference Board's 1986 Marketing Conference.

The construction of decision support systems should be driven by the need to solve a problem as opposed to a need to find a way to organize an avalanche of information, executives on the panel noted.

A key element in manufacturing liquor is tracking shipments to the manufacturer's wholesaler in order to forecast short- and long-term business conditions. However, Heublein found over time that its shipments did not always reflect wholesalers' deliveries to retailers, making it difficult to make market projections.

Using information on the shipments in Heublein's data base and historical figures the wholesalers provided about their inventories, Kelliher developed a model that he says provides closer monitoring of wholesalers' stocks. Among the benefits is better scheduling of national promotions, he said. "We are now able to focus on a given distributor whose inventory has decreased below proper levels as well as smooth out buying patterns," Kelliher said.

Kelliher's marketing group uses a number of IBM Personal Computer compatibles ranging from portables to machines in the AT class. They connect via telephone lines

See **SYSTEMS** page 79

Study predicts '87 MIS spending growth will hit all-time low

By Jeffry Beeler

PALM SPRINGS, Calif. — A recent survey of projected MIS budgets for 1987 portrays the coming year as a period of unusually sluggish growth in commercial information systems acquisitions.

Roughly 35% of the respondents of the survey, conducted by International Data Corp. (IDC), expect their 1987 systems budgets to increase by only a minimal 1% to 6% above current spending levels.

Even more startling is the finding that another 29% of the sampling predicts either no growth at all or an outright decline in next year's information technology outlays.

The responses, which IDC culled from 150 attendees at its Fall Executive Conference, held Oct. 27 through 29, constitute "the lowest rates of DP spending growth we've ever seen," according to Dave Moschella, the firm's vice-president for systems research.

If the survey results accurately reflect technology procurement plans for users as a whole, they bear ill tidings for many already hard-pressed vendors and presage a continuation of the industry's current doldrums, Moschella said.

In addition to probing users for details about their MIS budgets, the survey asked respondents to rank various concerns according to their potential for diminishing systems effectiveness.

As expected, product integration difficulties occupied a prominent place in the list of leading bugaboos. But to IDC's surprise, the conference attendees rated other DP considerations, such as application

See **STUDY** page 79

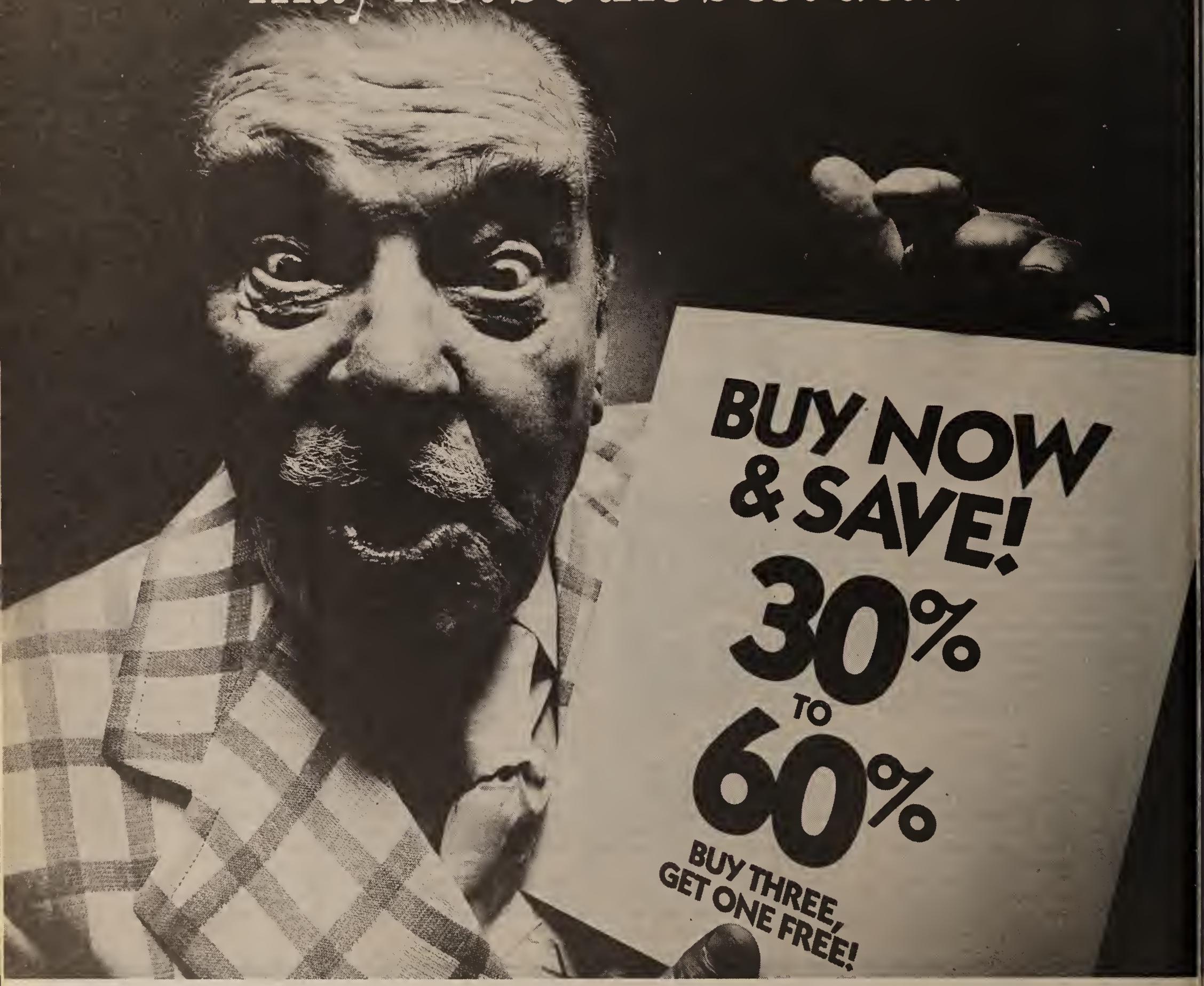
INSIDE

INSTANT ANALYSIS

"My message to you is to be sure that as part of your company's long-range plan you have a long-range information plan."

— John P. Imlay Jr., chairman of Management Science America, Inc., in his keynote address at the 1986 Data Processing Management Association Conference

Why the least expensive mainframe financial software may not be the best deal.



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CALENDAR

NOVEMBER 16-22

ATM9-Electronic Delivery Systems Conference. Los Angeles, Nov. 16-19 — Contact: Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

S.I. Users Group's 19th Semiannual Conference. Boston, Nov. 16-19 — Contact: Software International, 1 Tech Drive, Andover, Mass. 01810.

Guide 66. Montreal, Nov. 16-21 — Contact: Guide Headquarters, 111 E. Wacker Drive, Chicago, Ill. 60601.

Intermec/Tema's "Winning Edge" Seminar. Natick, Mass., Nov. 17 — Contact: I/T, 19 Erie Drive, Natick, Mass. 01760.

Implementing Low Cost Cadd. Los Angeles, Nov. 17-18 — Contact: National Computer Graphics Association, P.O. Box 3412, McLean, Va. 22103.

Introduction to Human Resource Information Systems. Seattle, Nov. 17-18 — Contact: Association of Human Resource Systems Professionals, P.O. Box 8040-A202, Walnut Creek, Calif. 94596.

Managing the Strategic Data Planning Project. San Francisco, Nov. 17-19 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held Dec. 17-19 in Boston.

Strategic Issues in Managing Information Technology: Achieving Significant Improvements in Productivity and Effectiveness. Cambridge, Mass., Nov. 17-19 — Contact: Decision Support Technology, 51 Church St., Boston, Mass. 02116.

Telecommunications Markets: The Impact of IBM. Stamford, Conn., Nov. 17-19 — Contact: International Resource Development, Inc., 6 Prowitt St., Norwalk, Conn. 06855.

Thirteenth Annual Computer Security Conference. Atlanta, Nov. 17-19 — Contact: Computer Security Institute, 360 Church St., Northboro, Mass. 01532.

1986 CIPS Conference. Toronto, Nov. 17-20 — Contact: Canadian Information Processing Society, 5th Floor, 243 College St., Toronto, Ont., Canada M5T 2Y1.

Managing the Power of Information. Washington, D.C., Nov. 18 — Contact: Association for Information and Image Management, 1100 Wayne Ave., Silver Spring, Md. 20910.

Marketing, Sales Analysis and Forecasting Using Lotus 1-2-3. Philadelphia, Nov. 18-19 — Contact: Data-Tech Institute, P.O. Box 2429, Clifton, N.J. 07015.

Localnet '86, International Open Systems Conference and International ISDN Conference. San Francisco, Nov. 18-20 — Contact: Online International, 989 Avenue of the Americas, New York, N.Y. 10018.

Writing Better Computer Software Documentation for Users. Tempe, Ariz., Nov. 19-20 — Contact: Center for Professional Development, College of Engineering and Applied Sciences, Arizona State University, Tempe, Ariz. 85287.

VMS Performance Management & Capacity Planning Seminar. Cambridge, Mass., Nov.19-21 — Contact:

See **CALENDAR** page 77

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Raxco, Inc., 1370 Piccard Drive, Rockville, Md. 20850. Also being held Jan. 28-30 in Westshore, Fla.

NOVEMBER 23-30

Conference for Artificial Intelligence/Expert Systems. Boston, Nov. 24-25 — Contact: Software Tools Conference, Suffolk University, Boston, Mass. 02108.

Satellite Telecourse on Distributed Processing. Atlanta, Nov. 24-26 — Contact: Association for Media-Based Continuing Education for Engineers, Inc. Satellite Network, 500 Tech Pkwy. N.W., Atlanta, Ga. 30313.

NOV. 30-DEC. 6

Engineering Workstations and the PC. Bedford, Mass., Dec. 1-3 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Optical Fiber Communications. Colorado Springs, Dec. 1-5 — Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

MAP/TOP Courses. Boston, Dec. 2-4 — Contact: Ship Star Associates, Inc., 36 Woodhill Drive, Newark, Del. 19711.

DEC: The Next Five Years. San Francisco, Dec. 3-4 — Contact: The Yankee Group, Seminar Division, 14th Floor, 89 Broad St., Boston, Mass. 02110.

Electronic Mail Industry Conference. Dec. 3-4, Washington, D.C. — Contact: EMA, Suite 300, 1919 Pennsylvania Ave. N.W., Washington, D.C. 20006.

Long Range Information Systems Planning. Philadelphia, Dec. 3-6 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

The 1986 Computerized Plan Administration Institute. Hollywood, Fla., Dec. 3-6 — Contact: Registrations Department, International Foundation, P.O. Box 69, Brookfield, Wis. 53008.

California Computer Show. Palo Alto, Calif., Dec. 4 — Contact: Norm De Nardi Enterprises, Suite 204, 289 S. San Antonio Road, Los Altos, Calif. 94022.

Software Rapid Prototyping. Dallas, Dec. 4-5 — Contact: EFDPMA Seminars, Dept. SRP, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held Dec. 11-12 in Anaheim, Calif.

Strategic Planning and Information Systems. New York, Dec. 4-5 — Contact: New York University, School of Continuing Education, Seminar Center, 575 Madison Ave., New York, N.Y. 10022.

DECEMBER 7-13

Software Testing Management Workshops. Jacksonville, Fla., Dec. 7-12 — Contact: Software Quality Engineering, Suite 16, 3015 Hartley Road, Jacksonville, Fla. 32217.

Disaster Recovery/Contingency Planning Seminar. Cleveland, Dec. 8-9 — Contact: ISR Consultants International, Inc., Suite 103, 3455 Washington Drive, Eagan, Minn. 55122.

Financial Microcomputer Conference. Atlanta, Dec. 8-9 — Contact: Financial Managers Society, Inc., Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

Applying Machine Vision to Electronic Component Assembly and Inspection. San Jose, Calif., Dec. 8-10 — Contact: SME Special Programs, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

The National Connectivity Symposium on Local Area Networks and Micro-Mainframe Links. Washington, D.C., Dec. 8-11 — Contact: Digital Consulting Associates, Inc., 6 Windsor St., Andover, Mass. 01810.

The IBM PC Data Communications Survival Course. Boston, Dec. 9 — Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015.

The 4th Computer Symposium for Local Government. St. Cloud, Minn., Dec. 9-10 — Contact: Government Training Service, 202 Minnesota Building, 46 E. Fourth St., St. Paul, Minn. 55101.

How to Design and Implement Bar Code Systems. Clearwater Beach, Fla., Dec. 9-10 — Contact: Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Optical Information Systems '86 Conference. Arlington, Va., Dec. 9-11 — Contact: Conference Management Corp., 200 Connecticut Ave., Norwalk, Conn. 06854.

International Conference on Management and Performance Evaluation of Computer Systems. Las Vegas, Dec. 9-12 — Contact: Computer Measurement Group, 6397 Little River Tnpk., Alexandria, Va. 22312.

1986 CAUSE National Conference. Monterey, Calif., Dec. 9-12 — Contact: Professional Association for Computing and Information Technology in Higher Education, 737 29th St., Boulder, Colo. 80303.

Software Quality Control Management Information System. Boston, Dec. 11 — Contact: James Ettwein, International Datatek, 7 Carriage Drive, Acton, Mass. 01720.

ACE's Third Annual Computer Education Conference. New York, Dec. 13 — Contact: Association of Computer Educators, Inc., 751 Bard Ave., Staten Island, N.Y. 10310.

DECEMBER 14-20

Seventh Annual Data Training Conference and Exposition. Washington, D.C., Dec. 14-18 — Contact: Conference Registrar, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

E pluribus computum

From page 73

Tallying these companies' losses revealed avoidable problems in the way end-user computing had evolved.

One financial services business bought micros from no fewer than eight vendors and signed maintenance contracts with five sources. Only one of the agreements specified same-day response to service calls.

A manufacturing organization installed seven spreadsheet packages, making it difficult for separate work groups to share spreadsheet data and producing disparate sets of numbers.

Through a review, the company found nine word processing packages in use. Because the end-user support team provided training and assistance on only one of them, the company sustained a loss of 8,000 man-hours while employees learned other programs by trial and error.

An insurance company tripled its training budget in one year because of the support needed for more than 20 personal computer software packages. An MIS department analyst estimated that five packages could have easily handled the company's needs.

Most of the troubled companies missed the benefits of end-user computing because they didn't estimate their costs, much less anticipate subtle increases like those from greater use of communications links. Lack of careful cost/benefit analysis led to inaccurate budgets and operations that ran deeply into the red.

The mistakes these companies made were largely avoidable. Corporations must pay for any rewarding new program, but they can predict many costs fairly easily. For instance, independent users often become headstrong about their purchases and buy a lot of hardware and software, so products proliferate in companies with end-user programs.

Obviously, training budgets must also grow to encompass new courses in applications development.

But more apparent on the bottom line are the hidden costs. As they climb on the computing bandwagon, inexperienced users can place big demands on computer resources.

Even when wary executives take the time to project end-user costs, their estimates can fall short. For example, in nine of the 17 companies I surveyed, the MIS departments' three-year plans to support end-user computing called for an extra shift — eight more hours — of corporate mainframe time every day. But in all these companies, new end-user traffic had so mushroomed that it clogged normal processing. Ultimately, all nine had to acquire a new mainframe dedicated to end-users. That was an unbudgeted expense in the $100,000 range.

The need for duplicate or "shadow" corporate data bases also raises costs by insidiously soaking up an organization's computer resources.

Moreover, maintenance costs, which usually constitute about 50% of the MIS department's budget, can skyrocket when end-users develop their own applications on their various machines. Nontechnical staff often pass on to the MIS staff the maintenance of inefficiently written applications.

In addition to budgeting, careful planning is necessary to steer companies clear of certain pitfalls. Two sources of difficulty arose with startling frequency in the less successful companies: a lack of formal cost justification and the failure of hard controls, those rigid policies for policing end users.

Hard controls

In trying to limit computer costs, many companies institute hard controls. It's not surprising that of the 11 companies suffering problems, the four that established no controls suffered the worst results. But curiously, the seven companies that resorted to rigid or hard controls also encountered huge cost overruns. Many tried to police users by requiring MIS approval for all purchases relating to personal computers and access to company data files.

The users in these businesses devised ingenious ways to circumvent the controls. For example, purchase control specified MIS approval for items that cost more than some threshold amount — usually about $3,500 (the cost of a personal computer with useful business features). To avoid having to get approval, users unbundled their purchases, buying the basic processor on one order, the printer on another and software on a third.

Some embedded personal computers in an existing minicomputer budget, listed them as terminals and renamed software "program documentation." When one MIS organization conducted an audit a year after implementing hard controls, it was surprised to discover more than 1,500 unapproved personal computers. Nor did the control on MIS files prove worthwhile. Users simply built their own files from scratch or by entering data from the regular computer output that MIS provided.

Obviously, the circuitous approaches hurt company budgets. MIS departments couldn't fully exploit quantity discounts, and failure to employ MIS expertise in writing contracts produced inadequate maintenance agreements. Worst of all, the multitude of unauthorized data files cost the companies dearly, not only in labor, as users duplicated data-entry efforts, but also in accuracy of information. The re-entered files were full of errors and out of date. False data circulated, often influencing important decisions.

MANAGEMENT

Systems aid liquor sales

From page 73

with Heublein's IBM 4381 in nearby Hartford, Conn. The firm uses Focus, a data base management package developed by Information Builders, Inc., and a number of microcomputer application packages including Lotus Development Corp.'s 1-2-3.

Information is downloaded from the mainframe to the PCs, where it is reformatted for the the marketing department, Kelliher explains.

Joseph E. Seagram & Sons, Inc. in New York has taken the approach of using decision support technology to lower its distributors' costs.

"If we can do things to reduce our customers' costs and make it more profitable for them to handle our products than the competition's, it ultimately will increase our sales and profits," suggests Robert Hutton, director of consulting services and field warehousing at Seagram.

The firm, with the help of Dialog Systems, Inc. in East Lansing, Mich., spent about $40,000 during the last year developing a system that monitors direct product profitability.

The system, which runs on IBM PC-compatible machines, analyzes a wholesaler's revenue for a Seagram product relative to its costs, including purchasing, order processing, transportation, handling, inventory and storage. Based on that data, the system then calculates profit margins per brand.

"It's shown us some interesting things about our products," Hutton says. "We did find out that some of our customers don't realize any profit on certain products and realize an exorbitant amount on others."

Seagram can use the information to lower costs for the wholesalers with which it does business, for example, rerouting and rescheduling shipments. Seagram does not share the figures it generates through its system with its distributors, although it may offer them more help in the future, Hutton said.

Kelliher advised fellow marketing managers to make sure their decision-support systems are user-friendly. Heublein has spent the last five years developing a data base that can be accessed through a series of yes and no questions.

In the past, Kelliher and his counterparts plowed through pages of reports in varying formats to distill vital information.

"Now, we have to simply push a few buttons to be able to see graphs, charts and share data," Kelliher says. "We know the reports will be simple, focused and what we want because they were designed by and for the marketing personnel who use them."

Study predicts minimal spending

From page 73

backlogs, as even more serious systems impediments than architectural incompatibilities, Moschella said.

"Although systems integration certainly qualifies as a major issue, it is no more important than capacity planning, network security, corporate data bases and a lot of other problems" with which users must also constantly contend, Moschella maintains.

As part of the same survey, IDC also quizzed the attendees about their chief information officers and uncovered a telling fact: Although nearly three-fourths of the respondents boast a chief information officer or the equivalent, roughly 30% of the firms have created the position within the last one to two years.

The swiftness with which chief information officer functions have recently been coming on-line prompted Moschella to speculate that many of the survey participants are currently in the midst of "considerable ferment, turmoil and rapid internal change."

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Marc Blessing
Director
CompuSearch
Cleveland, Ohio

A division of Management Recruiters International with 172 offices in the U.S., CompuSearch markets itself as the nation's largest recruitment agency devoted exclusively to MIS/DP placement. But it was not always that way, according to Marc Blessing, Director of CompuSearch.

CompuSearch needed to gain industry awareness. "*Three years ago the general public and most of the DP industry had never heard of CompuSearch. Prospective clients would often say, 'who?' when our account executives would call,*" says Marc. "*We needed national recognition and we needed a publication that would allow us to zero in on our target audience.*"

So CompuSearch started advertising in Computerworld. And it worked.

"*It worked because of Computerworld's audience,*" he explains. "*We're getting people with diverse backgrounds — from dedicated professionals with 2-3 years of programming experience to top MIS/DP management.*"

"*Computerworld's audience delivers the proven professionals that we look for,*" Marc reports.

"*Because of the new contacts that Computerworld produced on both the client and candidate sides, we decided to increase — actually double — our advertising in 1986,*" he adds. "*We've considered other publications, but we know that our dollars stretch farther with Computerworld. It allows us to hit our target audience,*" concludes Marc.

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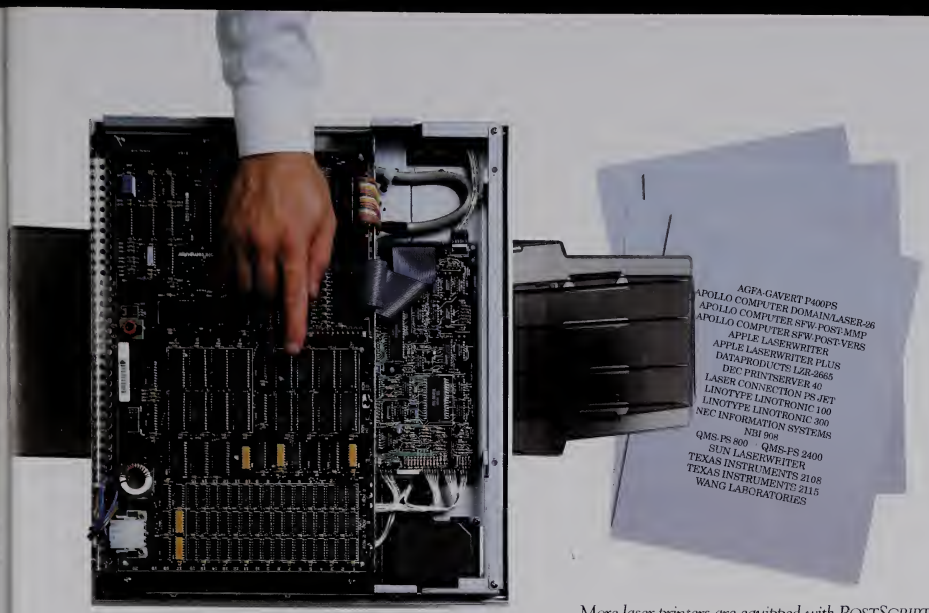

Before you buy a laser printer, make sure there's a POSTSCRIPT *controller board inside. Without this powerful board, you can't use* POSTSCRIPT. *And without* POSTSCRIPT, *you aren't taking full advantage of desktop publishing.*

More laser printers are equipped with POSTSCRIPT *than any other page description language. This means you can choose the vendor you want, the printer resolution that best suits your needs, and still stay within your budget.*

Only POSTSCRIPT *printers can use the Adobe Type Library. So you can select fonts from our wide selection of high quality typefaces and see your desktop publishing capabilities grow.*

It's nearly impossible to show everything POSTSCRIPT *can do. That's because, as far as we can tell, anything you dream up can be done. So whether it's a business report, bar graph, newsletter, or technical illustrations, it's up to you.* POSTSCRIPT *can handle it.*

The first desktop publishing system using PostScript is introduced.

1985

In one short year, leading software companies have recognized the importance of POSTSCRIPT *and have introduced hundreds of software programs. This gives you an unbelievable selection of applications. Just take a look at this partial listing.*

Telefont by Data Dynamics Inc.
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Fontographer by Altsys Corp.
Cricket Graph by Cricket Software
VersaCAD by T & W Systems Inc.
MagnaType by Magna Computer Systems
Cadvance by Calcomp Personal Systems Unit
JustText by Knowledge Engineering
MacTEX by FTL Systems, Inc.
Ingres/Graphics by Relational Technology Inc.
PageMaker by Aldus Corporation
Ready-Set-Go by Manhattan Graphics
ScenicWriter by Scenicsoft Inc.
PS Compose by PS Publishing
LaserScript/Plus by Tangent Technologies Ltd.
Fullpaint by Ann Arbor Softworks
The Financial Advisor by Palladian Software
Microsoft Chart by Microsoft Corporation
Microsoft Multiplan by Microsoft Corporation
Quantum Graphics by Threshhold Software
Waterloo Script by University of Waterloo
EZ-Draft by Bridgeport Machines
MacDraft by Innovative Data Design, Inc.
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Computer Aided Publishing System by ViewTech
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GEM Write by Digital Research, Inc.
Hockney's Egg by Peregrine Falcon
XyWrite III by XyQuest, Inc.
DO-IT by Studio Software
FrontPage by Studio Software
MECCA III by Amgraf, Inc.
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NEW PRODUCTS

IBM users get link to VAX minicomputers

The Systems Interconnect Operation of Intel Corp. in Santa Clara, Calif., and Flexlink International Corp. of Renton, Wash., have announced Fastpath + Flexlink, a combination of Intel's Fastpath control unit and Flexlink connectivity software that is said to provide a means to connect IBM 4300- and 3000-class mainframes to Digital Equipment Corp. VAX minicomputers.

According to the vendor, the Intel 9750 Fastpath control unit attaches directly to an IBM 370-class I/O channel and provides a direct 3M bit/sec. pathway into the mainframe.

Using Flexlink software in conjunction with Fastpath provides a bidirectional connection between a DEC VAX or Microvax and the mainframe.

Shared access to data files

Features of the link include the ability for IBM and DEC users to share access to data files, initiate tasks on each other's systems and share devices such as laser printers, the vendor said.

Virtual terminal emulation capability enables terminals connected to the VAX system to act as if they were connected to the IBM system and vice versa. The Fastpath + Flexlink product can also act as a bridge between IBM Systems Network Architecture networks and Decnet networks, the vendor said.

Fastpath can also be customized to accommodate multiple simultaneous connections. For example, when configured to support the connection between a 370 and a VAX, it can support up to four additional concurrent connections.

Specifications

The Fastpath control unit fits into a standard 19-in. rack.

It operates in a commercial computer environment and requires no modification to the IBM 370, according to the vendor.

The Fastpath + Flexlink is priced from $80,000 to $130,000, depending on the processor models being connected.

Sort/merge program debuts

Syncsort, Inc. in Woodcliff Lake, N.J., has announced Release 3.0 of its Syncsort OS sort/merge program for IBM OS environments.

Release 3.0 is said to provide performance improvements of up to 28% in task control block CPU time, 77% in service request block CPU time and 75% in execute channel programs compared with the previous release.

According to the vendor, the use of extended virtual storage by Release 3.0 enables IBM MVS/XA users to obtain performance benefits without changing job control language or sort control streams.

A new facility, called DSM/XA, is said to enable Syncsort to optimize its use of the extended addressing capability of MVS/XA. It allows Syncsort to synchronize its virtual storage utilization to reflect the availability of system resources.

In addition, Release 3.0 is able to interface with exits and invoking programs, including VS Cobol II programs, that use MVS/XA capabilities.

Another new facility, called Syncinit, is said to simplify Syncsort OS installation and maintenance and can be used to review and reset Syncsort default options.

According to a Syncsort spokesman, Sortwriter, the report writing facility, has been enhanced to allow data fields from records to be included in report, page and section headers and trailers, and the number of records can be counted at section, page and report levels.

Report formatting enhancements include the ability to convert data within a record to its printable hexidecimal representation. Binary zeros can also be inserted in the record.

Release 3.0 of Syncsort OS is reportedly licensed at $9,000 for three years, including maintenance and technical support.

Software allows network viewing

Standard Microsystems Corp. in Hauppauge, N.Y., has introduced Arcview Diagnostic Software designed for Datapoint Corp.'s Arcnet local-area networks.

According to the vendor, Arcview is a software-only network performance measurement tool designed to allow a network manager to view network operation in real time. Reportedly, the network manager will be able to monitor total Arcnet network activity as well as the activity at individual nodes. In addition, Arcview provides a background task that monitors network reconfigurations.

Arcview is composed of two main modules. View is an on-line network monitor that can be displayed on the network manager's screen, and Recon is the background task that can run on any node with an existing application. It signals the user of an Arcnet reconfiguration by means of a pop-up window.

Arview Diagnostic Software costs $95 in quantities of one to 99, the vendor said.

HP high-capacity disk drives available for commercial use

Hewlett-Packard Co. in Palo Alto, Calif., has announced a second generation of high-capacity 5¼-in. disk drives.

The HP 7957A, with 81M bytes formatted, and the HP 7958A, with 130M bytes formatted, are said to be fixed-disk mechanisms combined with an intelligent controller and power supply in a desktop box. According to the vendor, capacity and performance are designed for commercial or technical multiuser systems and engineering workstations.

The disk drives are said to combine an enhanced small-disk interface with a CS/80 controller. They offer a 28-msec average seek time and a 1.25M-byte burst-data transfer rate.

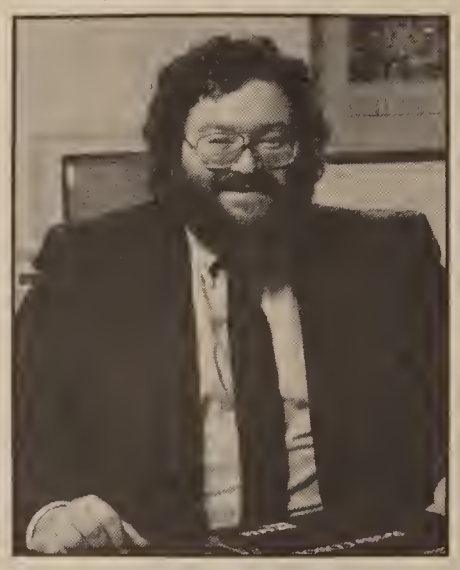
Both drives are 5.2 in. high, 12.8 in. wide and 11.2 in. deep. Four drives can be rack-mounted in a cabinet.

The HP 7957A costs $5,200. The HP 7958A is priced at $7,700.

INSIDE

"When REALIA wanted to tell the MIS/DP world about its micro COBOL compiler, there was only one choice — Computerworld."

Marc Sokol
Vice President
REALIA, Inc.
Chicago, IL



REALIA, Inc. manufactures REALIA COBOL, a micro COBOL compiler with the capacity, compatibility and speed to move development work — or production systems — from the IBM mainframe to a PC.

Their market is the larger companies that are making the big buys — the Fortune 2000. And to move their compiler into the MIS/DP departments at these companies, REALIA uses advertising. As Marc Sokol, REALIA's Vice President, states, *"We don't use a direct sales staff — we use Computerworld."*

Why? Because *"...everyone's always reading Computerworld. It's on everyone's desk. Just look around."* Marc goes on to say *"Computerworld's my only choice as far as reaching the MIS/DP professionals is concerned. They're the ones making the buying decisions in the larger corporations for my compiler product."*

If you're trying to reach decision makers in the computer market to tell them about your product or service, look to Computerworld. We cover the entire computer world. Every week. It's working for REALIA. And it can work for you, too.

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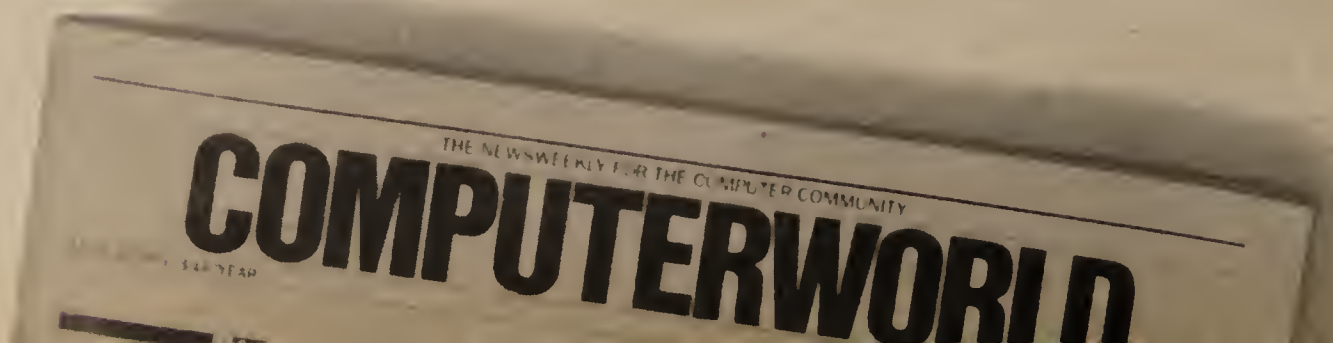

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SOFTWARE & SERVICES

Systems software

Davis, Thomas and Associates, Inc. has released **Version 1.2B** of its DTA/Recov forward recovery software package, which supports IBM CICS 1.7.

DTA/Recov Release 1.2B is available for IBM mainframe sites that require forward recovery of VSAM files and are planning to migrate to CICS 1.7. It utilizes standard CICS journal entries and the latest system backup to restore any VSAM file to its condition prior to the point of failure. It also incorporates a built-in verification process to ensure that the recovery procedure works in the event of a failure.

Permanent licenses cost $5,600 for MVS and $3,800 for DOS/VSE/SP operating systems.

Davis, Thomas and Associates, 8800 Highway 7, Minneapolis, Minn. 55426.

■

Nexus Computer Systems, Inc. has released its **Menu Security System** for the IBM System/38.

The menu-driven system is said to control user activity from sign-on by presenting menus that display and allow only authorized items.

According to the vendor, the system can build and maintain multilevel menus as it generates authorization files. It can change menus, menu items and authorizations without shutting down or recompiling.

The Nexus Menu Security System costs $495.

Nexus Computer Systems, 275 Commerce Drive, Fort Washington, Pa. 19034.

Applications packages

Articulate Publications, Inc. has announced **Extended File Handling** (EFH), a version of its Medicalis/Dentalis health-care practice management system said to allow more than 8M bytes and 65,536 records in a file.

The EFH version's enhanced B-tree eliminates sorting while allowing multiple key searching and reporting.

According to the vendor, the EFH-based system can handle any file up to 32M bytes or more and containing more than one million records.

Medicalis and Dentalis are priced from $6,995. The EFH option costs an additional $995.

Articulate Publications, 402 N. Larchmont Blvd., Los Angeles, Calif. 90004.

■

Precision Visuals, Inc. has announced **DI-3000 XPM**, a graphical data management package, and **Addsys-3000**, a subroutine library offering suport for the Tektronix, Inc. 4100 line of graphics terminals.

DI-3000 XPM is said to allow application developers to build and manipulate objects in a world-coordinate graphics data base. It includes a hidden-line removal utility.

Addsys-3000 provides access to local two- and three-dimensional segmentation, segment instancing and editing, raster operations and pixel data transfer for imaging applications.

Addsys-3000 costs from $1,000 to $10,500. DI-3000 XPM costs from $9,000 on a Microvax II from Digital Equipment Corp.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

Languages

Basis, Inc. has released **Business Basic Extended (BBX) Revision 8.**

Revision 8 is said to add support for the Intel Corp. 80386 processors under Microsoft Corp. MS-DOS and Xenix, IBM PC-DOS, the IBM RT Personal Computer under AIX and the IBM and Toshiba Ltd. portables in 3½-in. format.

New versions were also announced for Digital Equipment Corp.'s VAX series under Ultrix and VMS, Hewlett-Packard Co.'s 3000 series under MPE and the 9000 series Models 300 and 500.

BBX is a multiuser, multitasking business basic language. It supports Microsoft Windows, extended variable and function names, string arrays, string and directory file types, operating system shell commands and extended screen types.

Prices range from $295 for DOS to $5,000 for HP 3000 under MPE.

Basis, Suite 290, 5700 Harper Drive N. E., Albuquerque, N.M. 87109.

ON AT&T'S "HIGHWAY 3B" THERE ARE NO LIMITS ON WHERE YOU CAN GO WITH COMPUTERS.

Like it or not, the multi-system environment is here to stay. Mainframes will be mainframes. PCs will continue to proliferate like mosquitoes. And user needs will change every day.

It is high time somebody created a family of computers for an evolving mixed-system environment. The time is now. The "somebody" is AT&T.

Our 3B computer family is among the first to blend the technologies of data processing and communications. Result: a unique ability to distribute processing power across system lines, from user to user, desktop to department, and department to mainframe.

AT&T's 3Bs are easily linked *up* to IBM* mainframes and *down* to any combination of terminals, peripherals, and MS-DOS** PCs. The idea is to open communication between

COMPUTERS WITH THE FUTURE BUILT IN

3B2/310. Supports up to 14 users, 18 RS232C ports. Speed: 1.1 MIPS, 32 bits at a time. *All* 3Bs are 32-bit machines. Storage: 86MB internal hard disk; up to 516MB with Expansion Modules.

3B2/400. Supports 10 to 25 users, 46 RS232C ports. Speed: 1.1 MIPS. Storage: 172MB internal, to 860MB with Expansion Modules.

3B2 XM. Expansion Module adds 23MB cartridge tape storage and/or 30 to 72MB hard disk storage.

3B15. Serves 16 to 60 users, 128 RS232C ports. Speed: 1.6 MIPS. Supports 8 drives, with maximum storage of 2.7 *giga*bytes.

Not shown: Other members of AT&T's 3B computer family serve up to 100 users, across a wide range of business needs and environmental conditions.

systems—without forcing users to give up the applications they know and trust.

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The 3B's role in a distributed data processing environment can grow and change as your business evolves. For starters, UNIX™ System V permits the same software to run on a variety of machines, protecting your investment in applications and user training.

On the hardware side, the whole 3B family is like a big set of building blocks. Everything is modular. A system of feature cards and interfaces makes it easy to add functions or peripherals. Or add users. Or boost performance. Or all of the above—in any order, at your own pace.

Example: A 3B "starter" system that is cost-efficient for 6 users can easily grow to serve 60 users—and more—with the same efficiency. By networking 3B to 3B you can support *thousands* of users—like adding beads to a string.

Whether those "beads" are down the hall or an ocean away, AT&T's networking tools can swiftly unite them all into a single, flexible, responsive system.

WHERE ARE YOU GOING?

AT&T's 3B family was created *as a family* to enhance the systems you have today, without imposing limits on where you can go tomorrow.

You can start with the pieces you need to solve today's problem: linking mainframe and desktop, say; or pulling together a department. As your needs and ambitions change, so can your system. AT&T makes the pieces fit.

To learn how much we can do for your company today, and how far we can take you tomorrow, please contact your AT&T Account Executive, authorized supplier, or telephone 1 800 247-1212.

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**MS-DOS is a trademark of Microsoft Corporation.

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Ted Odolecki

Ted Odolecki, Business Manager – Terminals

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NEW PRODUCTS/SOFTWARE & SERVICES

Utilities

BMC Software, Inc. has announced **Unload Plus**, an IMS/DB reorganization utility.

Unload Plus is said to unload and scan data bases. According to the vendor, it is a functional replacement for the IBM HD Reorganization Unload and DB Scan IMS utilities.

According to the vendor, features include the ability to write abbreviated HD unload records and to unload compressed segments without first expanding them.

Another attribute of Unload Plus is its compatibilty with BMC's other reorganization utilities: Loadplus, Prefix Resolution Plus and Secondary Index Utility.

Unload Plus costs $9,750 or $540 per month.

BMC Software, P.O. Box 2002, Sugar Land, Texas 77487.

MICROCOMPUTERS

Systems

Texas Instruments, Inc. has expanded its **Pro-Cad 286** product family with four models for computer-aided design applications using the graphics capability of the Enhanced Color Display (ECD) system.

The Pro-Cad models come standard with 640K bytes of random-access memory, an 80287 numeric coprocessor operating at 8 MHz, a 40M-byte Winchester disk, a 1.2M-byte floppy disk and Microsoft Corp. MS-DOS 3.

The Model E40 comes with Autodesk, Inc.'s Autocad software. It costs $9,445; the Model E40 without Autocad costs $7,145; the Model 40 with Autocad software but without the ECD system costs $8,295; and the Model 40 without Autocad and without ECD costs $5,995.

Texas Instruments, P.O. Box 809063, H-886 Dallas, Texas 75380.

■

Comark, Inc. has announced the **Answer AT Color Twinax System Manufactured** by **Tatung**.

The system is composed of a 640K-byte installed motherboard, one 1.2M-byte floppy drive, an IBM Personal Computer AT-type keyboard, Microsoft Corp. MS-DOS operating system, a Sony Corp. Trinitron color monitor and a color graphics card.

The system costs $2,795.

Comark, P.O. Box 2608, 135 N. Brandon Drive, Glendale Heights, Ill. 60138.

Software applications packages

CS Laboratories, Inc. has introduced **C/Script 36** for the IBM System/36 Personal Computer.

C/Script is a Cobol application development system. According to the vendor, it generates complete OCL procedures, display formats and Cobol source and object members for SRT or MRT programs. It generates programs for file maintenance, inquiry, data entry and reports and allows users to enter custom code at any point during or after generation. It interfaces to any IBM System/36 editor for user code entry and help screen definition.

A license for C/Script 36 for the IBM System/36 PC is priced at $5,000.

CS Laboratories, P.O. Drawer 2871, Auburn, Ala. 36831.

■

Chipsoft, Inc. has announced **Turbotax**, a 1986 Internal Revenue Service-approved version of its tax preparation software package.

The package allows users to prepare a tax return on an IBM Personal Computer, PC XT, AT or compatible.

The software is integrated with 26 state packages and 33 federal forms and schedules with automatic cross-referencing among all forms and schedules. The Turbotax federal package including 33 forms and schedules costs $65.

Twenty-six state packages are available for $40 each.

Chipsoft, Suite 801, 4901 Morena Blvd., San Diego, Calif. 92117.

Software utilities

Principal Systems, Inc. has introduced a family of software and hardware products for use in converting word processing documents from one format to another.

The product line includes **PC Switch** for converting among popular personal computer word processing packages; **PC Switch Card**, a printed-circuit board with software that plugs into an IBM Personal Computer and supports conversion of 5¼-in. disks from dedicated word processing systems; and **PC Switch Drive**, a half-height disk drive said to accommodate 8-in. disks from older word processing systems.

Dedicated word processors and PC word processing software packages supported by Principal include the Lanier Business Products, Inc. No Problem, LTE-2 and Shared System; Wang Laboratories, Inc. OIS; and IBM Displaywriter, 5520 and OS/6.

PC Switch costs $495; PC Switch Card costs $2,795; and PC Switch Drive costs $1,195.

Principal Systems, Suite 100, 6611 Bay Circle, Norcross, Ga. 30071.

Software enhancements

Samna Corp. has announced **Samna Word IV**, a word processing package and **Samna Plus IV**, a document processor that includes built-in spreadsheet and text retrieval functions.

According to the vendor, the products do not replace Samna Word III and Samna+.

Added features include graphics and text integration; on-screen col-

Continued on page 88

Continued from page 87

umns; saving to disk; an IBM PC-DOS-compatible keyboard; forms processing capabilities; text sorting and numerical data capabilities; and equation processing.

Samna Word IV and Samna Plus IV are priced at $595 and $695, respectively.

Upgrades for current Samna Word users cost $150, according to the vendor.

Samna, 2700 Northeast Expwy., Atlanta, Ga. 30345.

Communications

Megahertz Corp., a subsidiary corporation of Vector Development, Inc. has introduced a Hayes Microcomputer Products, Inc.-compatible **modem** for the IBM Personal Computer Convertible.

The modem is an internal board unit and is bundled with a communications program.

According to the vendor, the modem costs $450.

Megahertz, Building 2-102, 2681 Parleys Way, Salt Lake City, Utah 84109.

Printers/Plotters/Peripherals

Electronic Form Systems has announced the **Formwriter 10, 10X** and **10XD** laser printing systems designed to store and print government and business forms. The systems are based on the IBM Personal Computer AT.

The printing systems are also said to provide the ability to combine variable data generated from software packages such as Lotus Development Corp.'s 1-2-3 with electronically stored forms to produce up to 20 completed business or government forms per minute.

The Formwriter laser printing systems are device-independent, according to the vendor.

The Formwriter 10 has simple laser printing capabilities of up to 20 pages per minute.

The Formwriter 10X includes dual offset stackers and a 2000-sheet paper deck.

An added attribute of the Formwriter 10XD is a duplex printing unit.

The Formwriter 10 is priced at $14,995.

The Formwriter 10X is priced at $19,995. The Formwriter 10XD is priced at $24,995.

Electronic Form Systems, 2395 Midway Road, Carrollton, Texas 75006.

COMMUNICATIONS

Communications software

KMW Systems Corp. has announced the **S/3xlink** software program said to enable an Apple Computer, Inc. Macintosh to emulate an IBM 5291 terminal connected to an IBM System/34, 36 or 38 using the vendor's Series II multiport and Series III single-port Twinax.

The software is said to allow the user to operate the Macintosh as an IBM terminal connected to a host or to transfer files between the Macintosh and the host using the optional Emulator Transfer Utility (ETU) program. Features include automatic error detection and retransmission.

The Series III Twinax with S/3xlink costs $995. The Series II Twinax with S/3xlink costs $1,495. The ETU is priced at $400, $500 and $800 for the System/34, 36 and 38, respectively.

KMW Systems, 8307 Highway 71 W., Austin, Texas 78735.

■

Business Computer Design has announced **Telex-Mint Version 3**, software said to give IBM System/34, 36 and 38 computers the power of telex and message processing.

Telex-Mint is said to allow users to create messages, reports, telexes, cables and mailgrams and send them over telephone lines at rates of 2400 bit/sec.to 4.8K bit/sec. to a network carrier. Incoming messages may be routed to any assigned printer or out queue and routed manually or automatically.

Features include the ability to create and send internal E-Mail, external bisynchronous communications, automatic message creation from the user's data base and message creation from documents in IBM Displaywrite/36, IBM Text Management/38 and other word processors.

Telex-Mint is priced from $2,350 to $3,250.

Business Computer Design, 900 Jorie Blvd., Oak Brook, Ill. 60521.

Multiplexers/Modems

Data Crossing Corp. has announced **Laptalk 1200C**, an internal 1,200 bit/sec. modem for the IBM Convertible.

The two-board modem offers Hayes Microcomputer Products, Inc. compatibility and includes a surge suppressor, which can be attached to any brand modem that uses standard phone lines.

Laptalk 1200C is priced at $435 including surge suppressor. The surge suppressor alone costs $49.95.

Data Crossing, Suite 3-803, 1405 Stevenson, Springfield, Ill. 62703.

■

Racal-Vadic, Inc. has announced the **9650PA** 9.6K-bit/sec. synchronous modem with a multiprotocol autodialer and 25-msec training time.

The modem operates at 9.6K, 7.2K and 4800 bit/sec. Its integral automatic dialer supports 801-type parallel automatic calling and 3270 SDLC, HDLC and 3780 binary synchronous serial dialing protocols. It is compatible with CCITT V.29 and V.27.

The 9650PA costs $1,695.

Racal Vadic, 1525 McCarthy Blvd., Milpitas, Calif. 95035.

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DESKPRO 386 will advanced personal computer copy its engine

The most memorable personal computer

Combining advanced 32-bit architecture with the most advanced memory technology, the COMPAQ DESKPRO 386 can process twice as much information as 16-bit computers in the same amount of time. For additional performance from the programs you use, you can break the 640-Kbyte memory barrier and use up to 8 Megabytes of high-speed 32-bit RAM with the COMPAQ Expanded Memory Manager. This software comes standard and works with programs that follow the Lotus®/Intel/Microsoft® (LIM) Expanded Memory Specification, allowing you to build bigger spreadsheets, sort larger databases and run more programs, without having to buy additional software or use expansion slots, leaving more room for you.

Specifications

Processor: *32-bit 80386; 16-MHz clock speed; 4- or 8-MHz 80287 coprocessor socket; real-time clock and battery.*

Memory: *One-Megabyte RAM at entry level, expandable to 14 Megabytes; 32-bit memory bus; COMPAQ Expanded Memory Manager.*

Storage Devices: *1.2-Megabyte diskette drive (one standard, second optional); 360-Kbyte diskette drive (optional); 40-Megabyte half-height fixed disk drive (average access less than 30 ms); 70-Megabyte full-height fixed disk drive (average access less than 35 ms); 130-Megabyte full-height fixed disk drive (average access less than 25 ms); internal fixed disk drive backup (40 Megabytes/tape).*

Standard Configurations

Model 40: *One-Megabyte random-access memory (RAM); one 1.2-Megabyte diskette drive; one 40-Megabyte fixed disk drive; three 8/16-bit expansion slots available; three 8-bit expansion slots available.*

Model 70: *One-Megabyte random-access memory (RAM); one 1.2-Megabyte diskette drive; one 70-Megabyte fixed disk drive; two 8/16-bit expansion slots available; three 8-bit expansion slots available.*

Model 130: *One-Megabyte random-access memory (RAM); one 1.2-Megabyte diskette drive; one 130-Megabyte fixed disk drive; two 8/16-bit expansion slots available; three 8-bit expansion slots available.*

Greater stores of knowledge

The COMPAQ DESKPRO 386 easily provides the most storage capacity and performance available in any personal computer. High-performance 40-, 70- and 130-Megabyte fixed disk drives access information 50 to 150 percent faster than those used in other advanced-technology PCs. Plus, they store from 5,000 to 50,000 more pages of data.

Storage drives access data faster, enhancing performance.

We also developed a fast, economical way to protect all that data. You can back up and verify 40 Megabytes of data on a single formatted cartridge at the timesaving rate of one Megabyte per minute—that's four times the capacity and twice the transfer rate of our previous system.

Shifting speeds

Some copy-protected software programs have varying speed requirements. So the compatibility experts at COMPAQ engineered the COMPAQ DESKPRO 386 to accommodate them. The system will *"automatically"* raise and lower the operating speed when your software requires it—one more way that our attention to detail further insures complete compatibility.

Expanding horizons

Exceptional expandability lets you add as many as four internal storage devices. Place up to 10 Megabytes of high-speed 32-bit RAM on the system memory board without using an expansion slot; 14 Megabytes of RAM using only two.

Or configure it using the COMPAQ Enhanced Color Graphics Board with built-in lightpen interface taking up a single slot. This leaves four expansion slots that are compatible with industry-standard expansion boards. So you can communicate with mainframes, in a network, or in a multi-user environment.

Built to higher standards, with "more" standards

We build more into the COMPAQ DESKPRO 386, with more care. We have included interfaces for printers and modems. We improved the keyboard to help touch typists avoid mistakes and simplify common chores. We offer a color monitor with enhanced color graphics. And we offer a one-year limited warranty. These are just a few of the reasons why the COMPAQ DESKPRO 386 is the unparalleled value for demanding users.

History in the making

COMPAQ reached the Fortune 500 faster than any other company in history by making computers that work better. And even though some companies may copy one or two of our latest computer's features, it will be years before they copy them all. Such concern for engineering detail is why COMPAQ Computers are recognized as best in their classes by industry experts and users alike.

For the Authorized Dealer nearest you, or to obtain a brochure, call 1-800-231-0900 and ask for Operator 29. In Canada, call 416-449-8741, Operator 29.

For engineering and design work, use a lightpen with the built-in interface on the COMPAQ Enhanced Color Graphics Board.

The most advanced personal computer because it incorporates the most advances.

It simply works better.

computer in the world

COMPAQ
DESKPRO 386™

Local-area networks

Agile Systems, Inc. has introduced the **AN 20/20 RF Nearside** and the **AN 20/20 RFL Farside** packet-mode broadband interface units.

The two-port units attach user devices to an Agilenet 20 network, providing distributed intelligence while enabling the user device to communicate on both an Agilenet 20 and a broadband local-area network.

The AN 20/20 RF is used to transmit data from the near-side hand end of the Agilenet to the transmission links, and the AN 20/20 RFL is used to transmit from the Agilenet to the far-side broadband. Features include error detection and correction.

The AN 20/20 RFL costs $1,450; the AN 20/20 RF costs $1,950.

Agile Systems, Suite 103, 1411 LeMay Drive, Carrollton, Texas 75007.

SYSTEMS & PERIPHERALS

Data storage

Distributed Logic Corp. has introduced the **DQ236 disk controller**, designed to interface up to four storage module drive-class disk drives to Digital Equipment Corp.'s Q-bus computer systems.

The controller allows drives providing up to 1G byte of disk storage capacity to be interfaced to LSI-11/23, 11/23+, Micro PDP-11 and Microvax computers. The controller is able to store all drive characteristics on the drive itself.

The quad-size circuit board provides a 32K-byte data buffer and supports transfer rates up to 2.5M bit/sec.

The DQ236 costs $2,450.

Dilog, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

■

Emulex Corp. has introduced the **Storage Module Disk Interconnect** (SMDI), a subsystem said to connect SMD drives to Digital Equipment Corp.'s Digital Storage Architecture (DSA).

The SMDI supports SMD/SMD-E drives with transfer rates up to 3M bit/sec. and capacities of up to 2.4G bytes formatted per subsystem. It connects to the DSA via DEC's Standard Disk Interface.

The SMDI supports dual access and static dual-porting capabilities and provides access to switches and status indicators for write protect, ready, run, port select, fault and diagnostic modes.

A typical subsystem consists of a cabinet with one 850M-byte SMD-E disk drive and is priced from $20,500.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

Terminals

Fujitsu Microsystems of America, Inc. has announcd the **Virtual Terminal 232** and **422**, said to link IBM Personal Computers to Fujitsu Series 2000 Pick-based business computers.

Supported by the Level 3 expansion of Fujitsu's Common Network Architecture, the products allow the PCs to serve as intelligent terminals or as network workstations capable of running both IBM PC-DOS and Pick applications.

The VT232 allows users to connect IBM PCs using the RS-232C port on the Series 2000 computer. The VT422 allows users to connect IBM PCs to an existing network of Series 2000 computers via multidrop connections using a Network Adaptor card.

The VT232 is priced at $199 per PC connection. The VT422 is priced at $595 per PC connection.

Fujitsu, 2075 Oakmead Village Drive, Santa Clara, Calif. 95051.

Printers/Plotters

Able Computer, Inc. has announced the **Mux Master LP,** a line-printer controller said to allow Digital Equipment Corp. users to attach high-speed parallel line printers to a Microvax II and run in a direct memory access mode.

The Mux Master LP consists of a print cluster and a host interface module. It allows up to 16 line printers to be attached to a single host interface and placed up to 2,000 feet from the host computer. It permits parallel data transfer of up to 15,000-char./sec. throughput per cluster.

The Mux Master LP module costs $1,500.

Able Computer, 3080 Airway Ave., Costa Mesa, Calif. 92626.

PRICE REDUCTIONS

Perennial has announced the price reductions for the **Perennial validation suites** for AT&T Unix System V and University of California at Berkeley Unix Version 4.2.

In addition to the price reductions, the test suite Driver has been enhanced. The Unix system call profile can be invoked during test output to an operator-specified directory.

The Validation Suite for System V has been reduced to $6,500 and the Validation Suite for Berkeley 4.2 has been reduced to $12,000.

Perennial, Suite 450, 4677 Old Ironsides Drive, Santa Clara, Calif. 95054.

■

Irwin Magnetics has reduced the prices for its family of **Backup** tape drives for personal computers.

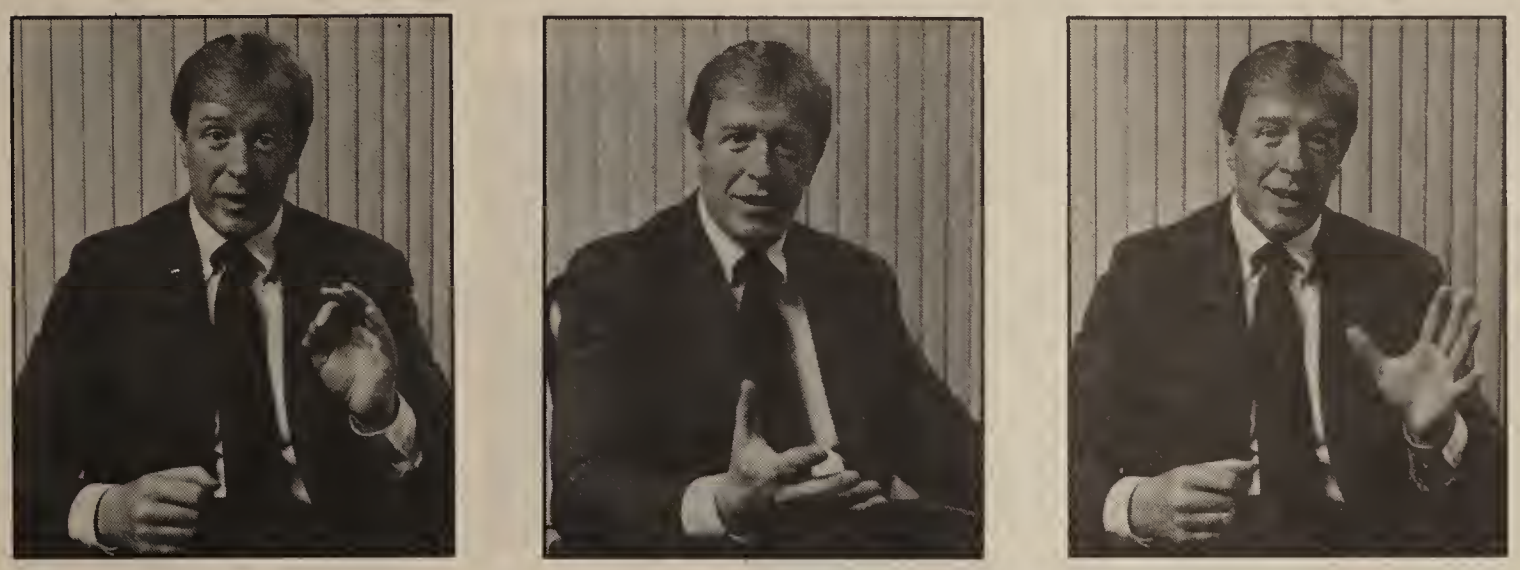
The Backup tape drives include 10M-, 20M- and 40M-byte internal and external subsystems.

Prices now range from $495 for a 10M-byte internal tape drive to $895 for a 40M-byte compact external subsystem.

Irwin Magnetics, 2101 Commonwealth Blvd., Ann Arbor, Mich. 48105.

"Just name a company, and we probably heard from them ...thanks to our ad in Computerworld."

Jack Luebeck
Director of Marketing
Pansophic Systems
Oak Brook, IL



How did Pansophic Systems, Inc. turn a tee shirt offer into a highly successful and profitable advertising campaign?

With the assistance of Computerworld.

Pansophic wanted to tell MIS/DP directors and managers from large and small companies about GENER/OL, its interactive application development system for CICS. So the company ran a testimonial ad in Computerworld and offered a free *Your System Isn't Ready Because. . .* tee shirt to respondents with the title of MIS/DP director or manager.

The tee shirts were used as entries to first calls, hand delivered by Pansophic salespeople. And a great number of shirts were delivered. *"We got responses from the high-level people that we weren't able to reach before, and these people were interested in more than just tee shirts,"* recalls Jack Luebeck, Director of Marketing for Pansophic. *"They were also interested in learning how GENER/OL can save them money, so the tee shirt requests yielded many viable sales leads. And those leads are already turning into sales,"* Jack reports.

And responses are *still* coming in. *"Responses have come from companies of every size. In fact, just name a company, and we probably heard from them,"* says Jack.

"We're now running only in Computerworld and we're expanding our program," Jack explains. Prior to this campaign, when Jack would ask his sales people for prospective publications in which to advertise, three or four publications were generally listed.

"Now the answer to that question is, 'I don't care where else, but make sure we're in Computerworld."

Computerworld. We're helping more suppliers reach more buyers more often in the computer community. We cover the entire computer world. Every week. We deliver the news, the analysis and the audience. Just ask Jack.

Call your Computerworld representative for all the facts. Or call Ed Marecki, Vice President/Sales, at (617) 879-0700.

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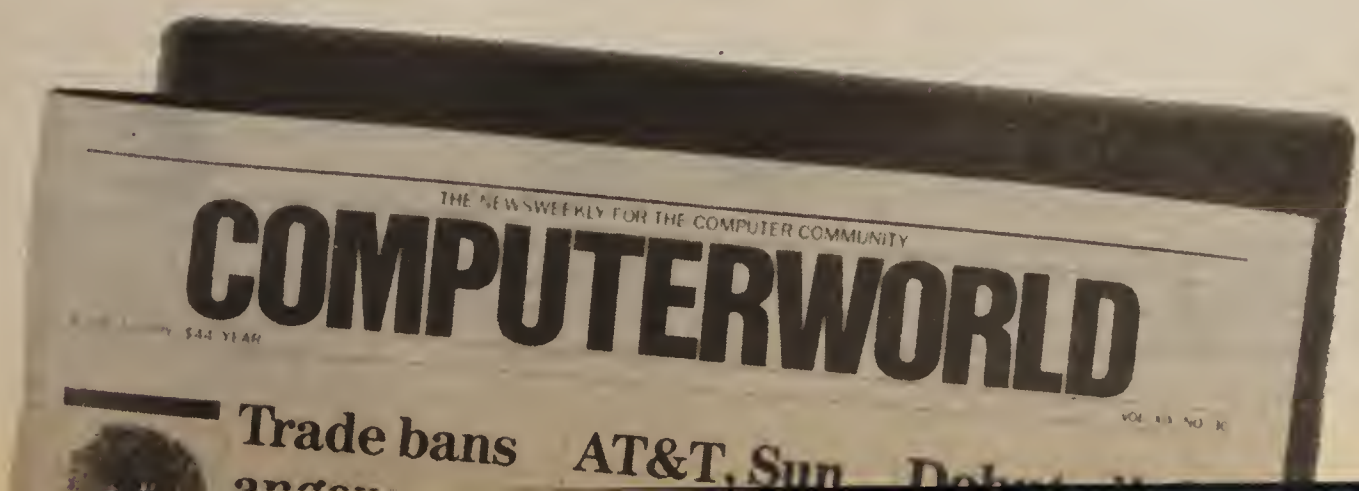


COMPUTER INDUSTRY

Section begins on page 126

Pittsburgh developer shows rapid growth in software mart

Listening to user needs, input benefits Duquesne

By Ninamary Buba Maginnis

PITTSBURGH — When user Tom Aubrey suggested that standard deviation and response time be included in a new product being developed at Duquesne Systems, Inc., he was pleased to discover his input was heeded.

"I was very impressed by it," says Aubrey, a technical consultant for the Boston office of Commercial Union Assurance Co., a British insurance company. "I've had discussions with other vendors to give my thoughts on products, and I've met with varying levels of success. Some vendors aren't interested or already think they have a better mousetrap. But Duquesne was not like that — even their marketing guy was very professional, low-key."

An ability to keep in touch with what customers need has helped Duquesne Systems grow to $24.2 million in revenue for the fiscal year ending Sept. 30, a 119% increase over fiscal-year 1985 revenue of $11 million.

Even more impressive, profits have grown at a comparable rate to remain at the incredible level of more than 20% of total revenue. Fiscal 1986 earnings soared 112% to $5 million, or $1.05 per share.

Duquesne Systems, founded in 1970, develops systems software for productivity improvement on medium and large IBM and compatible mainframes. "We, in a complementary way, fit right in with IBM," Duquesne President Glen Chatfield says. "There's no conflict with what we do and what IBM does."

Duquesne Systems' Chatfield

In concrete terms, Chatfield attributes Duquesne's recent rapid growth to three factors: its acquisition of competitor Single Image Software (SIS); the successful introduction of a new product, Terminal Productivity Executive (TPX); and an increase in international sales.

The $12 million acquisition of SIS last March filled out Duquesne's shared device management product line, giving it eight data center productivity offerings.

The firm benefited from SIS's smart packaging, which can leverage add-on sales, Chatfield notes.

All SIS products are distributed at once on a single tape, even though a customer may have purchased only one product. After the software is deposited on the system disk, an authorization code allows the user to access only the application purchased. When a customer expresses interest in another product, a temporary authorization code can be issued over the telephone.

"If a five-minute telephone conversation can give the user the solution to the problem, it gives us a tremendous advantage," Chatfield reports. Should the trial become a sale, a permanent authorization code is issued after the software license is signed.

Duquesne's TPX is another major contributor. The product was first built as a prototype by New York-based investment firm Morgan Stanley & Co. In 1984, the financial firm was seeking a software house that could market the product, Chatfield recalls. Awarded the job, Duquesne converted the application into a marketable product and was able to purchase the rights.

TPX gives users the ability to access multiple parallel applications from a single terminal. Other firms have competitive products, with Cincom Systems, Inc. and Westinghouse Corp. as Duquesne's major rivals.

User Tom Learned, a senior systems programmer for Boston-based Wm. Filene's Sons Co. department stores, says he knew about TPX before he joined the retailer's staff and was responsible for introducing it to the environment. "They fell in love with it," reports Learned, whose shop runs an IBM 3081 and plans to install an IBM 3090 this month.

"It gives users a common ability to log onto multiple sessions or a single session. It's very flexible and very easy to install. I had it up and running in less than an hour," he says.

Another aspect that Learned appreciated was the free 30-day trial offered on all the firm's products. "If we don't get a customer with the first product they try," Chatfield says, "we would rather leave because we're looking for the follow-on business and a long-term relationship."

Morgan Stanley's relationship with Duquesne did not end with TPX.

See **DEVELOPER** page 100

What do you call a computer that's about the size of a drinking fountain, comes rack-mounted like a stereo, needs no air conditioning, sets high standards for price and performance, works on a variety of networks, plugs into a regular wall socket, is easy on beginners and runs the same software as the biggest IBM mainframe?

"Supermini

They look like superminis but do things no supermini ever did before.

They work like IBM mainframes but go places (in both buildings and budgets) where no mainframe has ever been.

The IBM 9370 Information System is new, not simply as a family of machines, but also in the sense of changing (as PCs once did) some basic notions about how computers are used.

Now companies with IBM mainframes can distribute not only data, but their full mainframe capability. The 9370s run most IBM mainframe software.

At the same time, departments are free to run their own programs to meet special needs, and to make connections up, down and around the system.

And if your IBM 9370 is the biggest computer you have, should you ever outgrow it, your move to an IBM mainframe will be painless.

From the smallest 9370 to our biggest 3090 mainframe, IBM now offers a 100-fold range of power, all within one architecture. So whether you're moving up or down, your investment in applications and training is protected.

Easy to work with, easy to live with.

In size, the 9370s range from small to not very big. The smallest is only a meter high and can sit beside a desk. The largest can go wherever you might put two filing cabinets.

In fact, anywhere people can be, a 9370 can be. Air conditioning isn't necessary, and 110-220 volt wiring is all you need.

Also, a 9370 works almost inaudibly, requires very little attention, and can be installed in just a few hours.

Growth without growing pains.

There are four 9370s: Models 20, 40, 60 and 90. They are more alike than different.

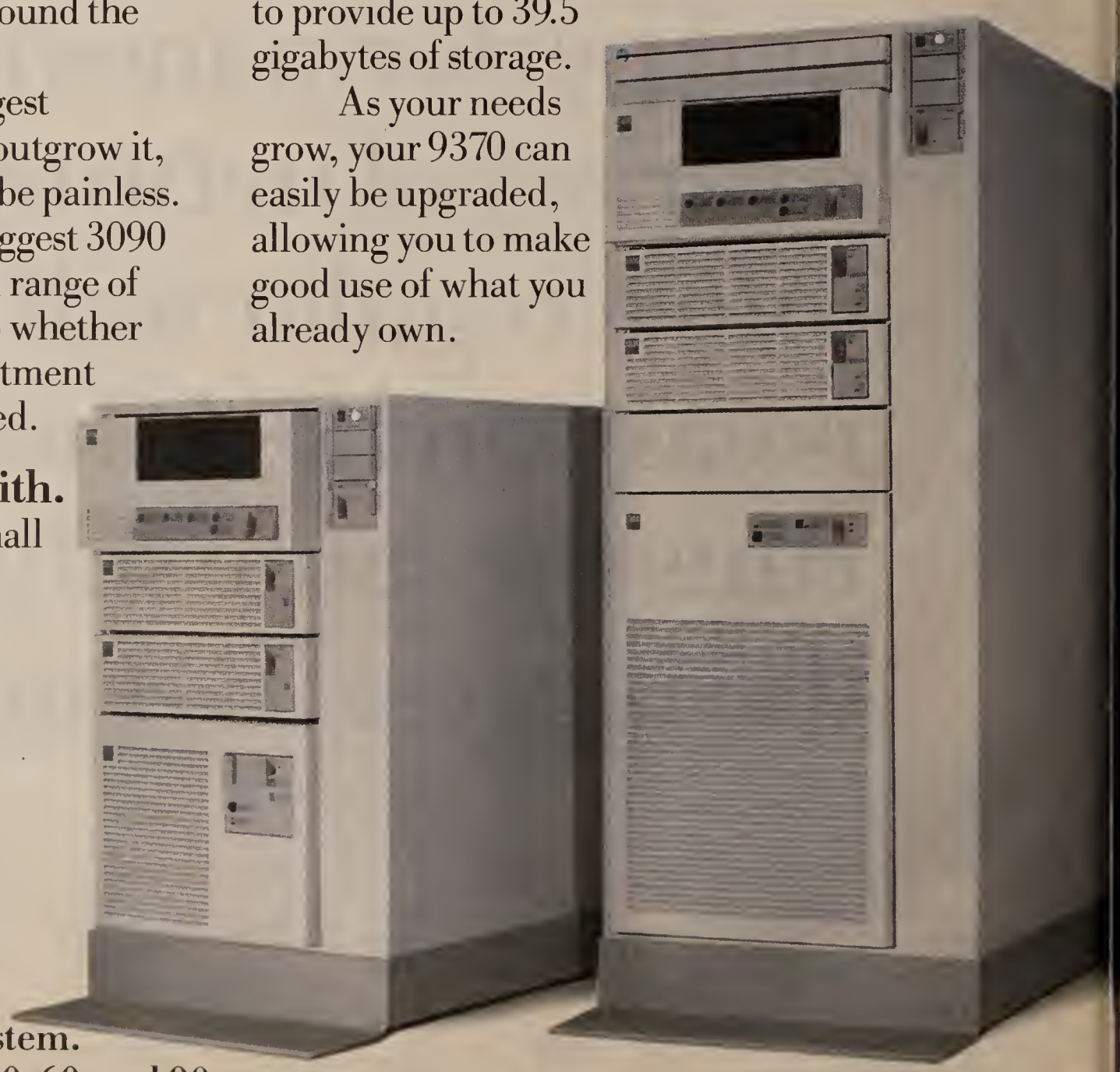
Each comes rack-mounted in a special shell, and there's a variety of interchangeable devices.

Four processors give the 9370s a five-fold power range, and two types of disk drives can be combined to provide up to 39.5 gigabytes of storage.

As your needs grow, your 9370 can easily be upgraded, allowing you to make good use of what you already own.

The new IBM 9370 Information System

SIZE:	Height—1.0 or 1.6 m. (3'3" or 5'3") Floor—.75 or 1.5 sq. m. (7.8 or 15.6 sq. ft.)
OPERATING SYSTEM SOFTWARE:	VM, VSE, IX/370, MVS/SP
CONNECTIVITY:	IBM SNA, IBM Token-Ring, Ethernet*, Bisynch, ASCII, TCP/IP, X.25, SOEMI
ARCHITECTURE:	S/370
PROCESSOR STORAGE:	4 to 16 MB
RACK-MOUNTED STORAGE:	368 or 824 MB DASD, up to 39.5 GB
PERFORMANCE:	5,000—25,000 transactions per hour, 0.12—0.79 MFLOPS**
TEMPERATURE RANGE:	10°C—40°C (50°F—105°F)
PRICE RANGE:	Hardware system starts at $62,600



The IBM 9370 Information System.
From left to right: Models 20, 40, 60, and 90.

mainframe"

And because it's an open system, you can attach both IBM and non-IBM devices.

Choice and flexibility, incorporated.

The IBM 9370s are well suited for both commercial and engineering/scientific work, a balance that comes partly from technology and partly from plain common sense.

Technology: The 9370s use IBM's new one-million-bit memory chips. And among other significant innovations there are new high-speed chips that can store or retrieve two unabridged dictionaries a second.

Plain common sense: The 9370s can use any of four operating systems, two of which come pre-packaged. You won't need them all, but as much as possible, we want the operating system you need to be one that we offer.

And while the 9370s run mainframe software, you won't pay mainframe software prices. Software costs have been reduced for the 9370s, and with graduated charges, much of it is priced relative to the size of your 9370 system.

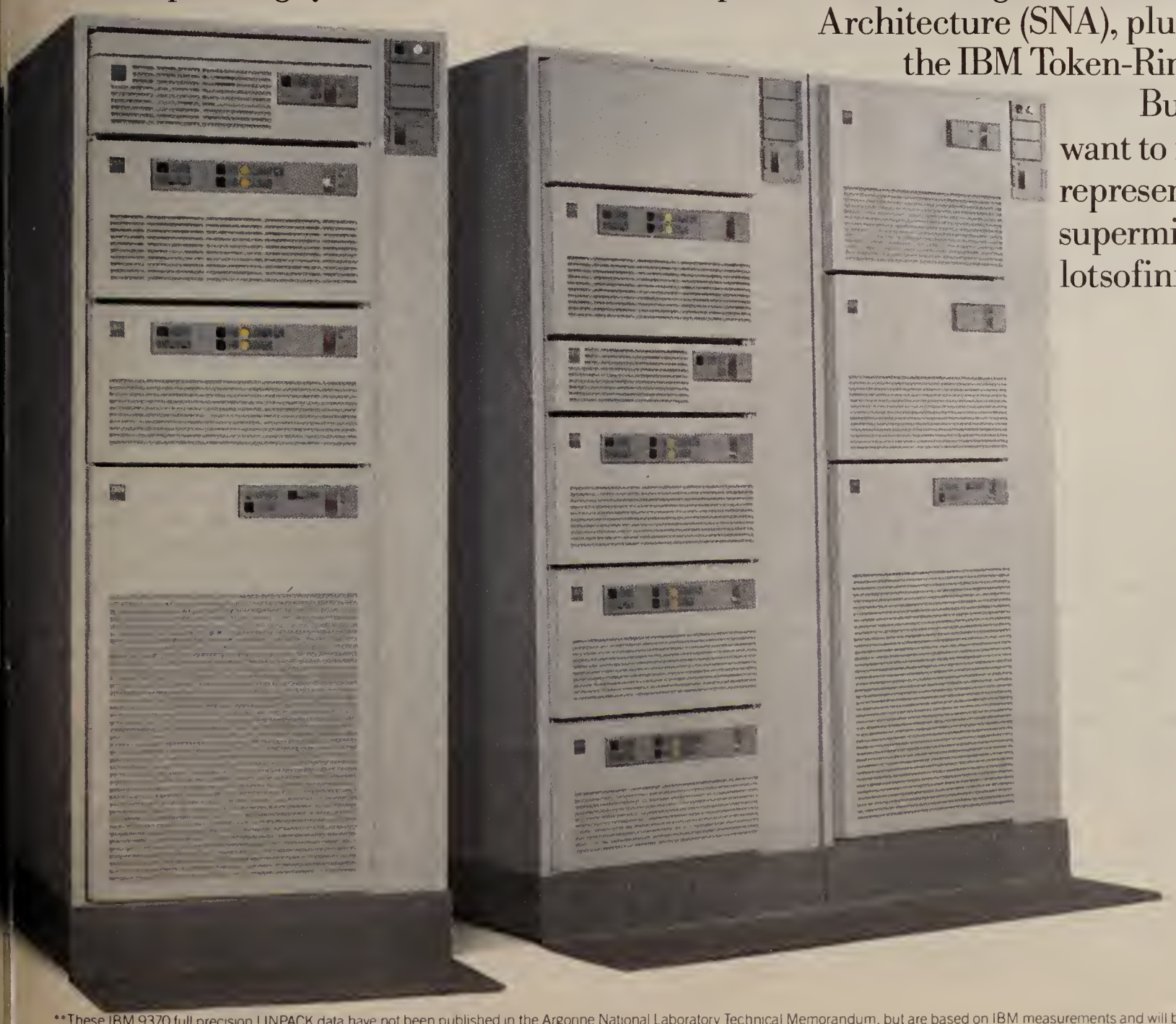
Now you can get IBM mainframe architecture in a family of mid-size computers.

New connections for you, and us.

An IBM 9370 can be a hub for up to 384 directly attached workstations, and supports many popular communications protocols and networks.

Among others, there's IBM Systems Network Architecture (SNA), plus two local area networks, the IBM Token-Ring and Ethernet.*

But the first connection you'll want to make is with your IBM sales representative. Just ask about the superminimainframe. You'll get lotsofinformationandafreebrochure.



IBM

**These IBM 9370 full precision LINPACK data have not been published in the Argonne National Laboratory Technical Memorandum, but are based on IBM measurements and will be submitted to Argonne National Laboratory for publication.

AT&T focuses on data networking in cost-cutting strategy

Olivetti deal will reduce overhead

By Alan Alper

NEW YORK — AT&T's embrace of a data networking strategy appears to be predicated on cutting costs through increased reliance on its European partner, Ing. C. Olivetti & Co., for low-end computer products while emphasizing its inherent strengths in communications.

For weeks, AT&T has publicly declared that data networking — essentially the linkage of computers via local-area networks, multiplexers and modems — is the primary focus of its recently merged Communications and Information Systems group. As part of this strategy, stand-alone computer sales are said to be de-emphasized.

The changes come as AT&T embarks on a corporatewide crusade to cut costs. Under recently installed Chairman James Olson, AT&T is looking to significantly trim overhead by reducing its corporate work force by approximately 30,000 employees through an early retirement plan. The company is also believed to be scaling back expenditures throughout the corporation with the Data Systems Division taking the brunt of the cutbacks.

Directing AT&T's data networking strategy will be Vittorio Cassoni, who was recently hired to preside over the firm's Data Systems Division [CW, Nov. 3]. At the same time Cassoni was hired, AT&T gave Olivetti, which already builds AT&T's IBM Personal Computer-compatible 6300 and 6300 Plus microcomputers, complete responsibility for design and production of its low-end computer products.

Lower overhead

Both moves should enable AT&T to lower its overhead, since Olivetti takes over expensive PC product development and costly pioneering marketing attempts in Europe, analysts say. "One thing is clear: AT&T will be spending a lot less money in the computer business than they have for some time," notes Glen Powers, analyst with Northern Business Information, Inc. in New York. "They are re-evaluating what's important to their core business — communications — and if something is not part of it, not quite profitable or not internationally related, or at-least two of the three, they don't want much to do with it."

The data networking strategy, AT&T insiders have said, is coalescing following regulatory relief granted the company, allowing the merger of its Communications and Information Systems groups. Under Computer Inquiry II, the government decree that allowed AT&T to enter the computer business, the firm had to keep those operations separate.

"Our strategy is not brand-new, but is fundamentally the same," noted John Boyd, sales vice-president for value-added resellers (VAR), dealers and major accounts, in an interview prior to Cassoni's hiring. "Under Computer Inquiry II, we had two different organizations focusing on different technology and product offerings. By merging the two groups, we are now better able to provide a unified, cohesive offering to our customers."

Doing what it knows best

Wendy White, an analyst with The Yankee Group, says by stressing data networking, AT&T is sticking to what it knows best — its Starlan local-area network, modems and multiplexers. "If one owns the pipes, it doesn't matter what type of information is flowing through them," she explains.

AT&T's Boyd said the emphasis is on building upon the firm's traditional communications strength to help corporations better manage the flow of information within their offices. The strategy, he says, recognizes that customers do not always buy integrated, end-to-end systems, but make modular purchases. "In the real world, customers often purchase equipment piece by piece and want to tie together what is installed with what is new," Boyd says. "We offer that capability and more."

Boyd claims, however, that the new strategy does not forsake selling stand-alone computers. "We will not only go after stand-alone sales if we see them, but we will aggressively pursue all opportunities," he stresses. To cut costs and better target niche markets, however, AT&T will rely on its resellers to handle stand-alone computer opportunities. "To that end, VARs and general resellers become more critical to that strategy," Boyd says.

Unix continues to be a key word at AT&T. Despite the AT&T Unix PC's lack of market acceptance — reportedly fewer than 5,000 of the Convergent Technologies, Inc.-built machines were sold this year — the company believes Unix offers the most elegant way of connecting computers. Unix, moreover, is still the standard operating system on AT&T's 3B line of minicomputers.

Boyd says when AT&T unveiled the Unix PC it miscalculated the adherence to the IBM PC-DOS standard. AT&T now offers a DOS coprocessor

See **AT&T** page 102

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COMPUTERWORLD

THE NEWSWEEKLY OF THE COMPUTER COMMUNITY

COMPUTER INDUSTRY

5¢ 10¢ NICKELS AND DIMES

Contel Corp. announced revenue for the third quarter ended Sept. 30 of $789.8 million, compared with $627.7 million a year ago. Profits were $60.3 million, or 78 cents per share, compared with $74.5 million, or 97 cents per share, in the like quarter a year ago.

■

Western Digital Corp. reported revenue for the first quarter ended Sept. 27 of $83.7 million, compared with $62.9 million in the previous year. Profits were $8.5 million, or 42 cents per share, compared with $3 million, or 15 cents per share, in the same period a year ago.

■

American Management Systems, Inc. announced net income for the third quarter ended Sept. 30 of $1.5 million, or 29 cents per share, on revenue of $28 million. This compares with net income of $1 million, or 21 cents per share, on revenue of $26.7 million in the comparable period a year ago.

■

Intergraph Corp. announced revenue for the third quarter ended Sept. 30 of $151 million, compared with $131.4 million one year ago. Profits were $15.5 million, or 28 cents per share, compared with $18 million, or 32 cents per share, last year.

■

Massachusetts Computer Corp. announced revenue for the first quarter ended Sept. 27 of $16 million, compared with $7.7 million a year ago. Net income was $890,000, or 6 cents per share, compared with a net loss of $3.3 million, or 23 cents per share, in the comparable quarter a year ago.

■

Printronix, Inc. reported a loss of $1.3 million, or 28 cents per share, on revenue of $32.1 million for the quarter ending Sept. 26. This compares with a loss of $1 million, or 20 cents per share, on revenue of $33 million for the same quarter of the previous year.

■

Logicon, Inc. announced net income for the second quarter ended Sept. 30 of $2.2 million, or 45 cents per share, on revenue of $51.6 million.

This compares with net income of $2.5 million, or 53 cents per share, on revenue of $50.8 million in the comparable period a year ago.

■

Filenet Corp. announced revenue for the third quarter of $7.8 million, compared with $3.4 million a year ago. Net income was $532,000, compared with net loss of $744,000 in the like quarter a year ago.

■

Xidex Corp. reported revenue for the quarter ended Sept. 30 of $135.1 million, a 57% increase over the $85.9 million reported in the like quarter a year ago. Profits were $9.8 million, or 22 cents per share, compared with $6.9 million, or 16 cents per share, in the previous year.

■

Sungard Data Systems, Inc. announced net income for the third quarter ended Sept. 30 of $1.6 million, or 18 cents per share, compared with $1.2 million, or 16 cents per share, a year ago.

Revenue for the third quarter was $16.9 million, compared with $14.8 million a year ago.

■

Tandem Computers, Inc. reported revenue for the year ended Sept. 30 of $767.8 million, compared with $624.1 million one year ago. Profits were $63.8 million, or $1.44 per share, compared with $34.4 million, or 82 cents per share, in the comparable period a year ago.

For the fourth quarter, revenue was $220.6 million, compared with $173.8 million a year ago. Profits were $21.6 million, or 47 cents per share, compared with $11.1 million, or 27 cents per share, in the like period last year.

■

Fortune Systems Corp. reported revenue for the third quarter ended Sept. 30 of $6.1 million, compared with $8.2 million a year ago. The company reported a net loss of $2.9 million, or 14 cents per share, compared with a net loss of $4.4 million, or 21 cents per share, in the previous year.

Developer grows rapidly

From page 94

The financial firm signed an April 3 agreement with Duquesne to make another prototype, STX, into a product.

STX, now undergoing beta testing, will give IBM display terminals an ability to access any packet switch terminals, Chatfield declares.

Although Duquesne has grown quickly, it has not sacrificed support for growth, according to users. "I've received excellent support," says Commercial Union's Aubrey, who had trouble with Duquesne's I/O direct-access storage device monitor, Dasdmon, during the free trial period.

"They told us what the problem was and why it happened," Aubrey says, whose shop runs an IBM 3090 Model 200 and an IBM 3081 G.

"When they fixed it, they understood what was wrong," he adds. "That's the most you can really expect from a vendor. Things do break. How it's handled when something goes wrong is important, and as far as I'm concerned, they do a super job."

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T-1 Open Systems Integration (OSI)—A Technical and Strategic Review

Leader: Harold C. Folts, Executive Director, OMNICOM, Inc.

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T-2 ISDN—Status and Developments

Leaders: James G. Herman, Director, and Mary A. Johnston, Senior Consultant, Telecommunications Consulting Group, BBN Communications

In this tutorial you'll learn what ISDN will and won't deliver in the late 1980s, what the emerging ISDN standards will mean for new services and improved network performance, what holes still exist in the standards and trials, how to make smart buying decisions while keeping open your options for ISDN compatibility, and more. *Level:* Intermediate.

T-3 Strategic Planning for Corporate Information Networks

Leader: Dr. Howard Frank, Howard Frank Associates

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T-4 Planning and Designing Networks with the New Technology

Leader: Dr. John M. McQuillan, President, McQuillan Consulting

In this intensive seminar, you'll get acquainted with the key architectural principles used by today's leading network planners. You'll review emerging technologies such as T-1 networks, hybrids, VSATs, gateways between SNA, LANs and X.25, micro-maintrame links, intercompany networks, and more. *Level:* Advanced.

T-5 Building the Network Management and Technical Control Facility

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Leader: Gerald P. Ryan, President and Founder, Connections Telecommunications Inc.

This one-day course briefs you on how to develop a successful management environment. You'll learn what tools are available to do your job more professionally, how to plan a network management center, how to staff and train the department, and how to prepare and substantiate departmental budgets. *Level:* Intermediate.

T-8 IBM Token-Ring Versus Other LAN Choices

Leader: Dr. Kenneth J. Thurber, President, Architecture Technology Corp.

This tutorial gives you an across-the-board overview of announced products, future plans, compatible products, and IBM's overall strategy with respect to Token-Ring technology. You'll discuss the Token-Ring's relationship to IEEE 802.5 and get an in-depth look at NETBIOS and APPC/LU 6.2 interfaces, and more. *Level:* Intermediate.

T-9 VSAT Technology and Implementation

Leader: Dr. Jerome G. Lucas, President, TeleStrategies Inc.

Learn the basics of applying very small aperture terminal (VSAT) satellite communications to your networking needs. You'll get acquainted with basic application requirements in SNA networking, data broadcasting, PC networking, video broadcasting, and teleconferencing. *Level:* Intermediate.

T-10 IBM's Systems Network Architecture (SNA): A Detailed Road Map

Leader: Daniel Zatyko, President, Zatyko Associates

Enroll in this intensive one-day tutorial to understand the evolution of SNA, and learn fundamental SNA concepts, the seven SNA architectural layers, SNA's physical and logical addressing, strategic SNA products, components of NetView, Token-Ring networks, functionality and capabilities of the LU 6.2/APPC and NETBIOS interfaces, and more. *Level:* Intermediate.

T-11 An Introduction to Data Communications Today

Leader: Gary Audin, President, Delphi Inc.

This course introduces you to the basic concepts, terminology and technology of data communications. You'll learn how various networks operate and how to select them; how best to interconnect computers, terminals, and PCs using different protocols, and what software is necessary to support protocols and network management. *Level:* Introductory.

T-12 Understanding the Communications Regulatory Environment

Leader: Richard E. Wiley, Senior Partner, Wiley, Rein & Fielding

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The explosive income fund

From page 126

number, in turn, is based on residual value forecasts.

And that is where the potential for abuse lies. The investor's ultimate return is based primarily on the computer's remarketing price. He funds the lessor's business up front then depends on the lessor's residual projections.

In the doomsday scenario envisioned by opponents of income funds, a capital-starved lessor, double-whammied by the loss of his own investment tax credit and the tax advantages he could market to investors, sets up a fund. In order to attract investors, he shops around for the highest residual forecasts he can find from market research and consulting firms. In essence, he then takes the investor's principal on a false promise of what his leased computers will bring in the aftermarket.

Such a scenario, and indeed the entire income fund controversy, may well be transparent to the lessee. But if the entire industry suffers a black eye (reminiscent of the Itel Corp. fiasco) from such questionable business practices, the users will feel the aftershocks.

The CDLA, which has fought hard over the years to forge an image of togetherness in a bitterly competitive industry, is playing its cards close to the vest on this one. What the association clearly does not want to do is ban all use of income funds from its accepted industry practices.

This would choke off a funding source for smaller and mainly private companies and play right into the hands of Comdisco, Inc., Equitable Life Leasing, Inc. and other lessors with extensive capital resources — either because of their own size or because of their deep-pocketed corporate parents.

What the CDLA might do, Gulko hints, is keep a closer eye on the residual numbers. It will attempt to forge closer relationships with the leading purveyors of residual forecasts; at the Colorado Springs meeting, the association welcomed market researcher International Data Corp. and consultants Marshall & Stevens, Inc. as associate members.

Gulko isn't accusing anyone specifically but notes there is an implicit conflict of interest in the market value of inflated residual forecasts.

"It's very easy to sell your service with high residuals," he says, "but that doesn't help the leasing company, and it doesn't help the investor. There needs to be some sort of commonality, and maybe the CDLA can play a role in that."

The end of the investment tax credit and other tax benefits has made residual values more critical than ever. "In the past, residuals have been almost fictitious to justify tax-based transactions," Gulko says, referring to the days when typical lease terms and CPU life cycles were from five to seven years.

But the difference now is the computer leasing investors can no longer receive tax breaks, only income — thus the name income fund. It is a whole new game, and the leasing companies have an awful lot to lose if they don't play it ethically.

■

Just one thought on IBM boss John Akers' disappointingly bland keynote speech at ADAPSO's 25th anniversary conference last week in Phoenix. In a clear sign of the times, Akers managed to avoid almost any mention of what must be a very sore subject: IBM.

AT&T focuses on data networking

From page 98

board with the micro, which it hopes will make the product more attractive. Boyd stresses that the Unix PC is "still a viable member of our product family," although analysts doubt that AT&T would renew its relationship with Convergent in light of Olivetti's strengthened role in determining microcomputer product planning.

Acknowledging that profits and revenue are below plan, Boyd suggests AT&T's computer business problems are more a result of bad timing than anything else. "Look, we entered the business at a time when there were peak growth rates," he says. "We feel we've done well even with the economy and industry conditions being what they are."

Difficult task

Cassoni, who joined Olivetti in 1980 after a 13-year career with IBM, faces the task of making the Data Systems Division profitable, following a year in which AT&T's computer business losses reportedly could exceed $500 million. He also inherits the unenviable task of having to rally an 8,000-member organization said to be suffering from low morale.

"He faces a very hostile environment. It could be another Archie McGill situation," notes Fritz Ringling, an analyst with the Gartner Group, Inc. in Stamford, Conn., in reference to another IBM veteran who joined AT&T computer business ranks and reportedly did not mesh with the firm's corporate culture.

Other analysts believe an outsider might prove to be the right tonic for AT&T's struggling computer business. "The worst thing about the current situation is that everyone in the division is wandering around wondering whether they're going to be fired," suggests Northern Business's Powers. "Someone new could cut through all that quickly and do what needs to be done."

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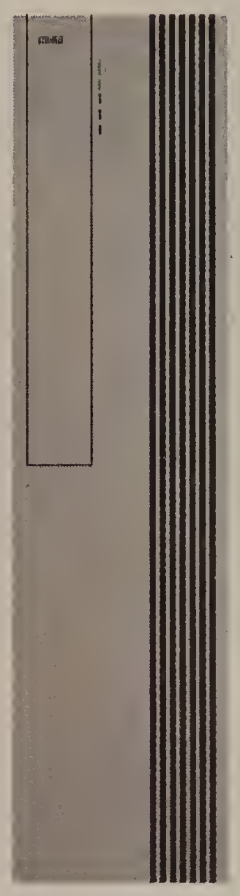

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Dean has always had the inside track in the world of computers. The son of a DP manager, he began programming in COBOL and Fortran at the age of 12. At 23, McCormack & Dodge, Dun & Bradstreet's software development company, hired him from his formal training at Hartford's Computer Processing Institute before he could even finish.

His philosophy was quite simple, even in his earliest days. Not one to live by others' rules, he vowed to employ any tactic, embrace any product, use any technology, as long as it got the job done.

Several years ago, for instance, he was forced to move his entire IS/DP department across town. IBM told him the job would require at least a week of downtime. And that was all the challenge Dean needed. He rented rooms for his staff for a weekend at a nearby hotel, and accomplished the task between business hours Friday to Monday. Every one of his 700 terminals was up and productive Monday morning.

In 1984, Dean designed and implemented a nationwide SNA network so all 12 U.S. offices could demonstrate McCormack & Dodge's mainframe software on site. That move contributed significantly to a 50% revenue growth in the following year.

Today, Dean is responsible for a staff of 150, and a budget of nearly $15 million a year—a good part of which goes to purchase the 300 micros (and attendant peripherals) he installs every year. And he reports directly to the CEO.

Dean is also an avid road racer—he runs some 60 miles a week—an active member of the BMW Car Club of America, and a world traveler.

As you can imagine, Dean's a busy man. But if you really want to reach him, you can.

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As young and accomplished as Dean is, he's by no means alone in his success. Information Services is a young industry. Full of individuals with individual visions. Yet they all seem to have one common insight.

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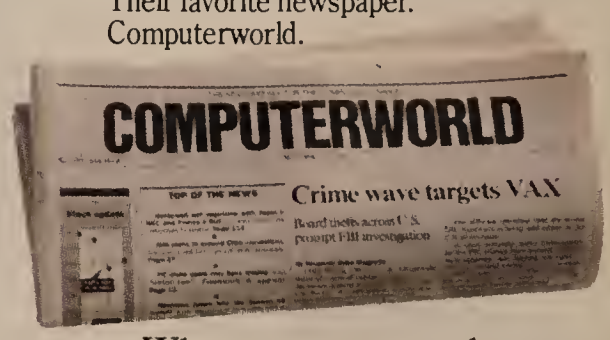

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Novell buys manufacturer of micros, nets

By Alan Alper

OREM, Utah — Local-area network vendor Novell, Inc. said last week it purchased in a cash transaction Santa Clara Systems, Inc. (SCS), a San Jose, Calif., maker of storage subsystems, microcomputers and local-area network products. Terms of the purchase were not disclosed.

Privately held SCS, which posted revenue of about $4 million in its recent fiscal year, is being operated as a wholly owned subsidiary of Novell.

SCS, Novell and Hyundai Group, the South Korean diversified manufacturer, agreed last month to jointly develop and manufacture a low-cost terminal for local-area networks. Under the agreement, SCS is designing the product, which runs Novell's Netware networking software, and will also market and sell the product. Hyundai will manufacture the terminal in South Korea.

Judge discloses stock ownership

From page 126

right laws and that the microcode in its V series of microprocessors did not infringe upon Intel copyrights on its 8088 and 8086 chip codes.

Disclosure statement

An NEC spokeswoman said the company only recently became aware of Ingram's indirect Intel stake from a disclosure statement that the judge signed before the trial began on May 12.

The statement listed Ingram's involvement in the investment club.

In an Oct. 27 hearing on the matter, requested by NEC attorneys, Ingram said he was unaware of his Intel ownership and has since resigned from the investment club.

Although NEC spokeswoman Lourdes Cogswell said that Ingram has an excellent reputation, she said that the development shows "some poor record keeping on someone's part."

"We fear that it sheds some very serious questions on the validity of any rulings," Cogswell said.

Options

Ingram has the option of hearing the motion for dismissal himself or referring it back to Federal District Court.

If he chooses the latter, another judge will be assigned to hear the motion, which could delay both the motion and the lawsuit if the assigned judge's calendar is filled.

Additional testimony in the Intel-NEC lawsuit is scheduled for early next year.

No action is expected to occur on the dismissal motion for several weeks.

Intel counsel said the company will file a memorandum to oppose NEC's motion.

Fujitsu, NEC report severe profit declines

By Takehisa Kondoh

TOKYO — In mid-year financial statements issued last week, Japanese computer vendors NEC Corp. and Fujitsu Ltd. reported heavy declines of 50% and 82%, respectively, in net profits.

A large profit decrease also hit Mitsubishi Electric Corp. — its after-tax earnings were down 44%.

The three firms blamed the deterioration on large export declines, triggered by the U.S. dollar's radical fall in value against the Japanese yen in the past 18 months.

Earlier this year, two other leading Japanese computer makers, Hitachi Ltd. and Toshiba Corp., posted severe half-year profit drops of 46% and 69%, respectively, which the vendors attributed to the same cause.

Another factor cited by the vendors was heavy delays in the rehabilitation of the semiconductor industry.

NEC's earnings went down to 20.1 billion yen, or $30.8 million for the six-month period ended Sept. 30.

Total revenue, however, inched up 6.6% from a year ago to about 1 trillion yen, or $6.5 billion, because the company's computer and telecommunications divisions remained largely unaffected by the U.S. dollar's decline.

NEC's after-tax profit fell 50% to 15.9 billion yen, or $103.5 million. Fujitsu's profitability for the same period also declined, falling to 4.1 billion yen or $26.6 million. Fujitsu's sales leveled off from the 1985 corresponding term, to 688.3 billion yen, or $4.5 billion.

At Mitsubishi Electric, after-tax income dropped 44% to 6.9 billion yen, or $44.5 million. Revenue stayed flat at 880.7 billion yen, or $5.7 billion.

Mid-term earnings were flat for Oki Electric Industry Co., at 2.1 billion yen, or $13.4 million, on sales of 158.8 billion yen, or $1.03 billion. Oki's sales were down 11% from the same period for the previous year.

Kondoh is Asian bureau chief for the CW Communications International News Service.

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Vice President/Marketing
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Don says the high quality of leads generated by Computerworld is borne out by the close ratio. *"Our close ratio is almost twice as high with leads from Computerworld than from any other publication that we use,"* reports Don.

Quantity and quality at the same time? *"Definitely,"* says Don. So much so, in fact, that following an earlier campaign, Virtual wrote to Computerworld and happily announced that *". . . it paid off! We are not only getting a satisfactory quantity of leads, but we're seeing a higher quality than ever before."*

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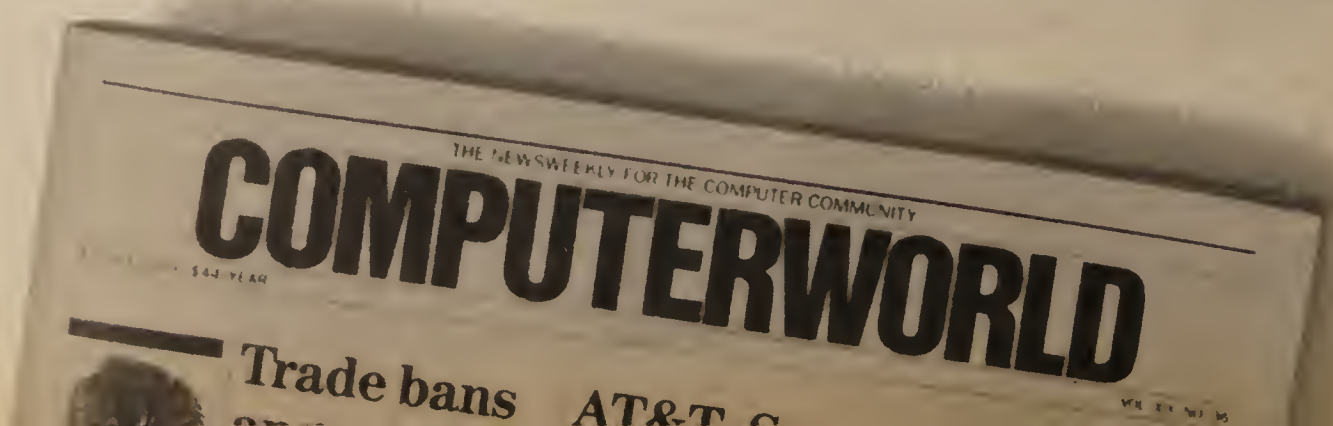

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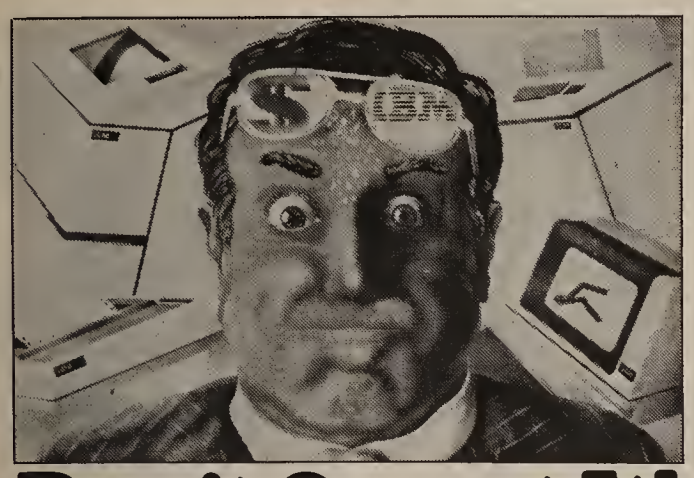

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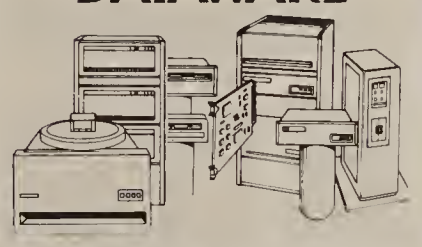

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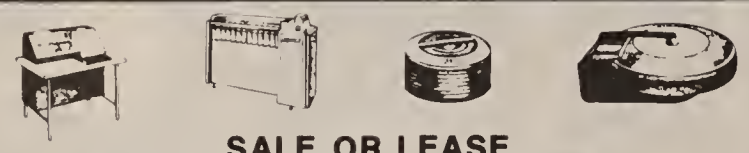

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Our need is for individuals with experience ranging from 1-5 years. Our opportunities for advancement are almost limitless, as the best in software talent move into both management and technical fields.

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Major Los Angeles-based Fortune 500 company seeks qualified candidate to assist the technical programming effort in development and implementation of new and revised systems, insuring accurate and efficient operation. Position involves heavy on-line programming in an OS/MVS environment with IMS/DL1 database exposure required.

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Design for system to support real-time sensor packages processing live data – this aspect assesses and performs situation correlation in a tactical environment on a large-scale VAX/VMS-based configuration.

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Write device drivers, perform SYSGENs, configure and fine-tune the OS, and provide system design support. IAS experience desirable.

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Opportunity to perform requirements analysis from component to system level using structured analysis and design tools. RF signal analysis background desirable, must know external communications software, advanced LANs, communications software design. Must know assembly language programming, preferably MACRO-11; control software knowledge desirable.

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All of the preceding positions require a minimum of a bachelor's degree in electrical engineering, computer science, mathematics, physics, or a related field – graduate degrees desirable. Experience levels vary by position from 3 to 15 years' background.

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You must also have demonstrated competence in one or more of the following:

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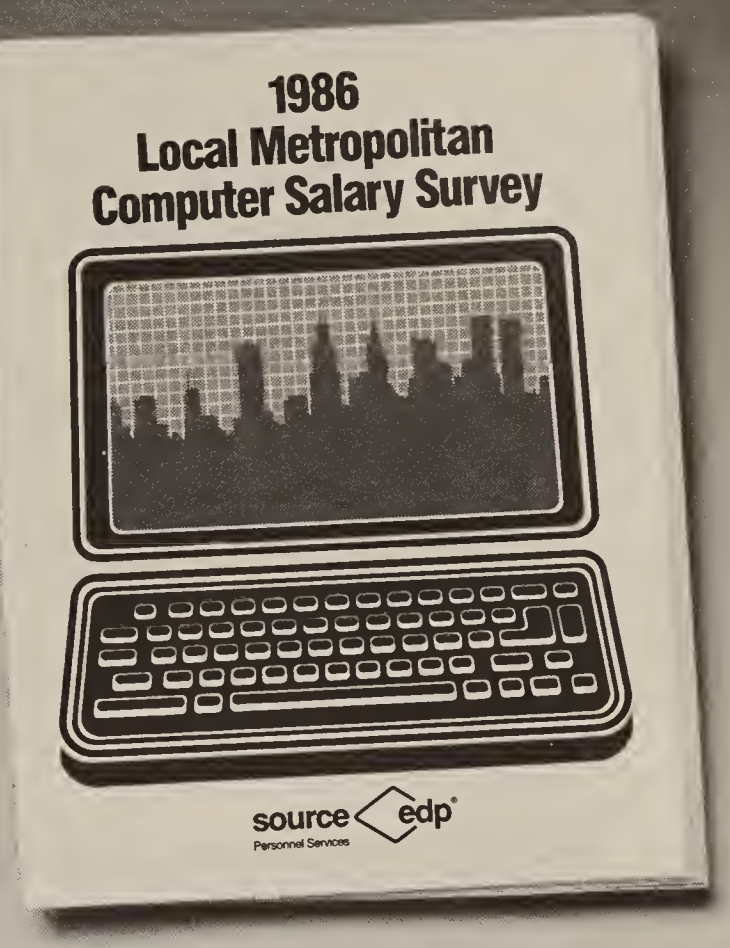

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Requires MS degree in Computer Science. Requires one year experience including the following areas: fault-tolerant distributed computing systems computer network architectures, implementing object oriented fault-tolerant systems, specification and verification methods for distributed programs, operating systems concepts, distributed systems and networking algorithms, database management systems and concurrency and replica control methods, UNIX 4.2 internals, C programming language, and SUN's NFS architecture. Salary $4,275.00 per month.

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This person will develop programs in C and assembler languages for use in systems software, including memory management, task management, and I/O services. Applicants must have a bachelor's degree in computer science or equivalent work experience, and in-depth experience with micro/mini operating systems, including operating system internals, design, and development. Applicants must be proficient in software design and able to debug system software at the assembler level. Experience with assembler MC 68000 microprocessor family, the UNIX® operating system, and the C language is preferred.

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EXECUTIVE DIRECTOR ALABAMA SUPERCOMPUTER NETWORK AUTHORITY

The Alabama Supercomputer Network Authority, in conjunction with the Department of Finance, is charged with the establishment of a supercomputer center to provide services for the educational, research, and industrial needs of the state. The authority invites nominations and applications for the position of Executive Director. The supercomputer will be physically located in Huntsville, Alabama with statewide access through a high speed telecommunications network with major nodes located throughout the state. The executive director and his or her staff will provide the management and direction of the program and will report directly to the authority.

RESPONSIBILITIES OF THE EXECUTIVE DIRECTOR:

1. To provide leadership and coordination for the facilities vendor.
2. To consult with the community of users and establish procedures necessary for fair and equitable access to the supercomputer.
3. To insure the quality and proficiency of the services provided by the facilities vendor.
4. To provide and execute a marketing plan which insures the best and maximum use of the supercomputer for the development of the State of Alabama.
5. To advise and instruct the facilities vendor regarding acquisition of hardware, software and any general service enhancement.
6. To serve as the primary representative of the authority in liaison with the executive and legislative branches of state government.

QUALIFICATIONS:

1. An earned master's degree, doctorate preferred.
2. A minimum of ten years of progressive experience in the overall management and/or coordination of high level computing services preferably with supercomputer involvement.
3. Substantial experience in a university and/or organized research environment with a high level of computer use.
4. Proven ability to organize and market services to diverse clientele.
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Salary is competitive and negotiable depending upon experience and qualifications. Applications or nominations and requests for information should be directed to:

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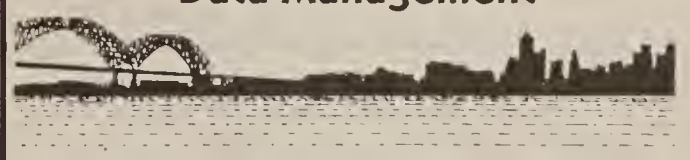

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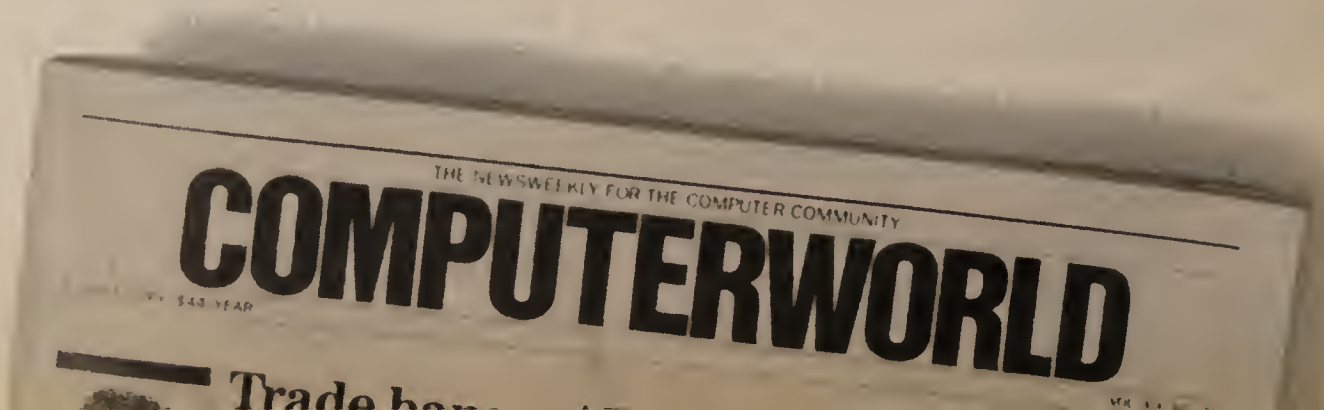

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Tax reform spurs buy-outs

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which will be named later.

MSA, based in Atlanta, will pay $7 million for all of Comserv's common stock, $3.5 million for Control Data Corp.'s 20% stake in Comserv and $16.5 million to cover Comserv's current operating deficit.

The deal combines the second and third largest vendors of manufacturing resource planning (MRP) software. According to Focus Research, Inc. in West Hartford, Conn., Comserv holds a 13% MRP market share, and MSA controls 9.5%. The market leader is IBM with a 31.3% share.

"We want to be the manufacturing software company," said William Graves, MSA president and chief operating officer.

Comserv offers both IBM mainframe and Hewlett-Packard Co. HP 3000 versions of its flagship MRP line, Advanced Manufacturing, Accounting and Production System (AMAPS). Vohs agreed that some of Comserv's high-end products are similar to MSA's but said the firm is committed to maintaining all of its current packages. "When there is overlap in some markets, we will recommend one system over the other," he said.

Comserv, with about one-sixth of its customers using the HP 3000, marks MSA's second acquisition move this year into the minicomputer-based MRP market. Last April, MSA acquired RTS Ltd. in Dublin, a vendor of MRP and financial systems for the IBM System/36 and 38.

Vohs said MSA's strategy is to offer more integrated financial and MRP programs to the highly decentralized, multivendor MIS operations of manufacturers such as Dart & Kraft, Inc., Hobart Corp. and Rockwell International Corp.

Scott Smith, a software analyst with Donaldson, Lufkin & Jenrette, said MSA's acquisition strategy makes sense. "It's good to see MSA putting money into its core businesses instead of other segments of the software industry," he said.

Computer Associates-Issco. Computer Associates, located in Garden City, N.Y., said it would make a tender offer of $12.37 per share in cash for all of Issco's 5.6 million outstanding shares.

Charles Wang, Computer Associates's chairman, said Issco's graphics software, which runs on computers ranging from mainframes down to 32-bit workstations, would complement his firm's current product offerings.

"Computer Associates has been real good at getting data back to a person in report form or through an on-line query facility," Wang said. "The third leg is to provide it in a graphics format. This acquisition will allow us to do that."

Wang said he plans to operate San Diego-based Issco as a separate division. Issco Chairman and CEO Peter Preuss, who is devoting his time to his brain cancer foundation, would be retained as a consultant, Wang noted.

Issco itself made a major diversification move earlier this year by acquiring a controlling interest in Mimer Information Systems AB, a Swedish relational data base vendor.

"Computer Associates gets mainframe graphics software that fits well with its rich array of software products, while Issco gets broader distribution in the marketplace," said Bernard Goldstein, a partner with Broadview Associates, a Fort Lee, N.J., merger and acquisition specialist.

Issco, founded in 1970, reported revenue of $40 million in its last fiscal year.

Pansophic-SPSS. James A. Hodges, vice-president of finance and administration at Oak Brook, Ill.-based Pansophic, said the acquisition would broaden his firm's customer base and product portfolio in the application software area.

"SPSS is strong in the scientific/academic and government markets, while we are strong in the business community, so there's not much of an overlap," Hodges said. "In terms of technology, they have statistical packages which work on an impressive number of mainframes, minis and microcomputers, while we are more involved in the mainframe area."

Chicago-based SPSS is expected to record revenue between $25 million and $30 million in the current calendar year, while Pansophic reported revenue of $81.4 million in its fiscal year, which ended April 30, Hodges said.

Tandy continues to fly high as PCs spearhead success

ACTIVE ISSUES
Kathy Porteus

Tandy Corp. is on a roll. In recent weeks, shares of Tandy (TAN — 40) have steadily climbed by 30%. According to at least two analysts, this strong stock performance should continue.

What started Tandy's stock on this upward move were the company's better-than-expected September quarter results. For its first fiscal quarter, Tandy reported earnings of 49 cents per share, compared with 47 cents per share for the same period a year ago.

Tandy is also heading into what is usually its best sales season with a new roster of IBM-compatible personal computers. Nevertheless, Eugene Glazer, analyst with Dean Witter Reynolds, Inc., says he believes the current push in Tandy's stock price represents more than anticipation of a strong Christmas.

According to Glazer, Tandy's rising stock price reflects solid initial market acceptance of the Tandy computers introduced last summer and belief that the stock has been undervalued. Another factor contributing to the stock's recent climb, Glazer says, was a potential corporate stock buy-back program that reduced downside risk.

"Furthermore, the stock is helped by a growing understanding among investors that Tandy is indeed a major factor in the microcomputer business," Glazer says. Because Tandy has been best known for its extensive line of consumer electronics products, sold through its own Radio Shack Corp. retail outlets, the company's presence in the business and professional microcomputer markets has only recently gained serious recognition.

Tandy's commitment to the higher end microcomputer market is characterized by the company's initiation, last spring, of a training program for 1,500 corporate sales representatives. But according to analysts, it is still too early to gauge the effectiveness of this corporate marketing effort.

According to Terence McEvoy, vice-president with Smith Barney Harris Upham Co., Tandy sells its microcomputers on price/performance features rather than on price alone. Tandy's new Model 3000, an IBM Personal Computer XT-compatible computer built around Intel Corp.'s 80286 microprocessor, is available with either a 20M-byte or 40M-byte hard disk drive for standard system prices of $3,599 and $4,299, respectively. IBM's PC XT Model 286 comes only with a 20M-byte hard disk for $3,995.

McEvoy says demand for new Tandy 1000 models, based on Intel's 8088 chip, is particularly strong and "has certainly revived Tandy's Radio Shack Computer Centers." According to Tandy, its current monthly production level of 50,000 Model 1000 units does not meet demand.

While Tandy exploits its distribution and service network with a series of new computer products, its year-old venture into brand-name electronics retailing also has analysts smiling.

In 1985, Tandy acquired two chains of discount brand-name electronics stores; it plans to expand to 300 stores by June 1987. During the current fiscal year, Tandy's management expects these stores to report 50% gains over last year's sales. According to Dean Witter's Glazer, the high inventory turnover and low profitability of the brand-name electronics stores produce a rate of return comparable to Tandy's high-margin but low-turnover business at its Radio Shack stores.

Both Glazer and McEvoy recommend Tandy. In fiscal 1988, with benefits from new tax legislation, Tandy will earn $4.10 per share or better, McEvoy estimates. "I see no reason why the stock won't be back in the 50 or higher area," he says.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Chip merger concerns U.S.

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industry analyst with L. F. Rothschild, Unterberg Towbin.

Although Fairchild has been foreign-owned for years — as a U.S. division of France's Schlumberger Ltd. — the government only began to show interest when it became clear that a Japanese firm might gain control, Johnson adds.

"All of a sudden Fujitsu is the bad guy because it is Japanese and doesn't have operations in America, like Schlumberger. But the real concern is that the Japanese are acquiring some American technology, and that's a little startling to everyone. Most everyone in the industry feels that they have enough to worry about as it is with the continuing slump," Johnson states.

Edward C. White, a semiconductor analyst with E. F. Hutton & Co., stresses the implications of Fujitsu's bold move into U.S. marketing and distribution. "The distributors are worrying about how it will affect the distribution networks, since U.S. distributors have not been able, because of trade agreements, to handle components from a Japanese supplier," he says. "This acquisition could throw distribution into disarray."

Apart from defense considerations, analysts believe the administration needs to take an active role in trying to preserve the vital U.S. chip industry.

"Right now technology policy is being set on a piecemeal basis by those who aren't very well coordinated," said Steve Szirom, president of HTE Management, Inc. in Scotts Valley, Calif.

Hayes seeks modem royalties

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cal-Vadic, a Milpitas, Calif.-based data communications vendor. "There will be some decisions made about whether there are noninfringing alternatives and whether litigation would be a suitable alternative to signing such a license."

Hayes began mailing out copies of its licensing policy in mid-October. So far, no modem vendors have signed up, and the company does not anticipate any for several months because "it takes time to pass those letters around throughout an office," the Hayes spokeswoman said.

The licensing policy could draw larger microcomputer modem vendors together to discuss alternatives, while those companies with only a small stake in the business might be forced out.

"This will definitely impact how far we get into the modem business," said J. B. Deters, president of Peachtree Technology, Inc. in Roswell, Ga., which manufactures a line of 1,200 bit/sec. modems.

"Hayes has the majority of the market share, so this might cause us not to focus in that direction. Larger modem companies might consider redesigning a modem to get around the patent, but then, it would probably cost less to just pay the royalty," Deters observed.

COMPUTER INDUSTRY

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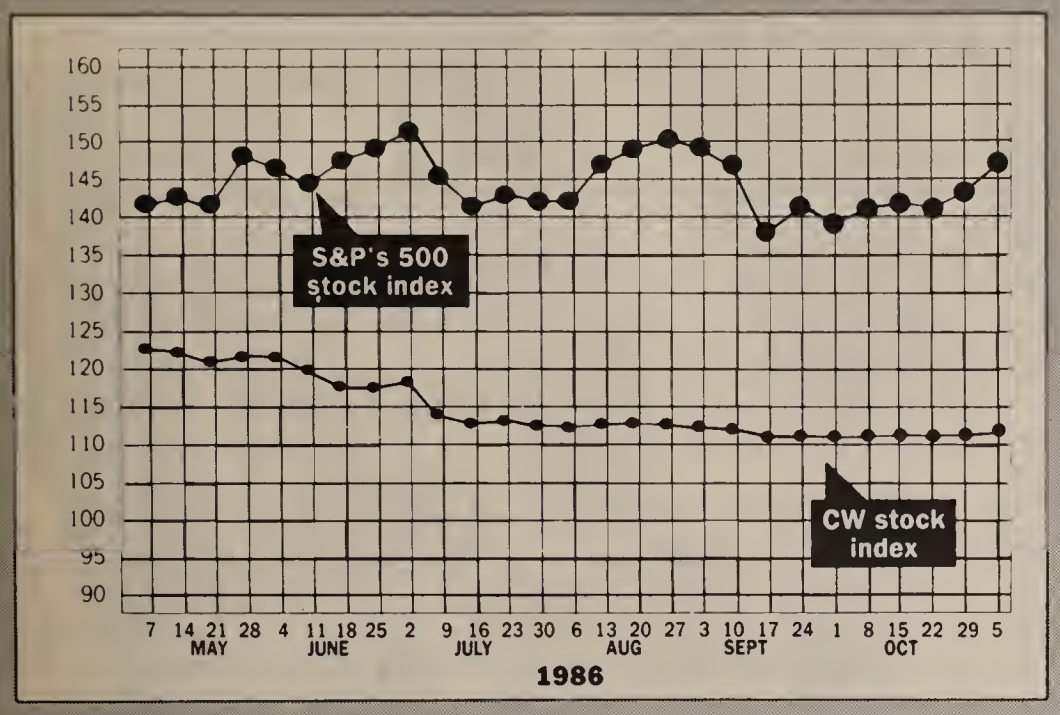
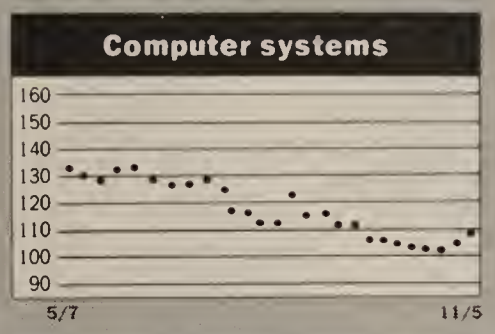
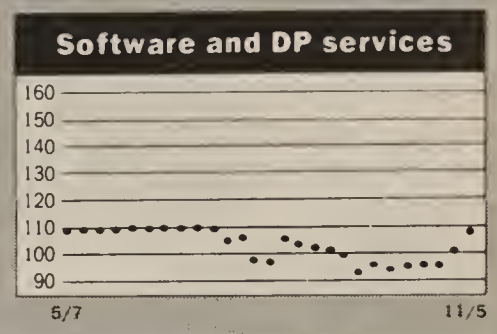
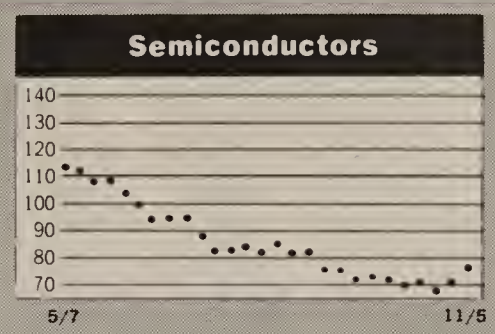
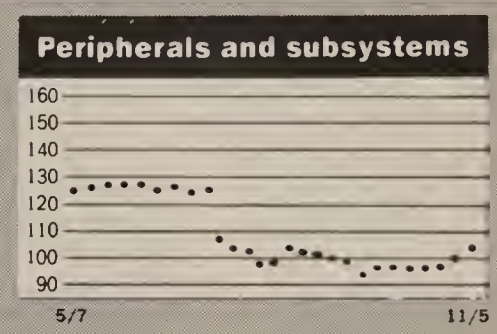
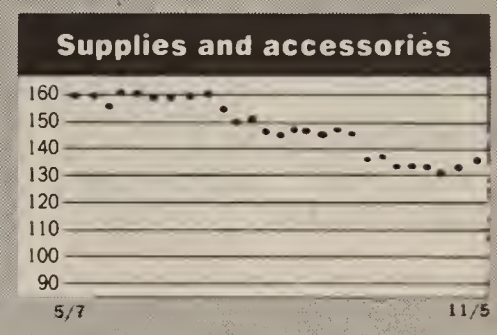












All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	10/29/86	11/5/86
Computer systems	105.9	**108.9**
Software and DP services	100.6	**107.2**
Peripherals and subsystems	100.1	**101.9**
Supplies and accessories	132.3	**134.3**
Semiconductors	71.4	**75.2**
Leasing companies	96.6	**96.0**
CW stock index	111.7	**112.2**
Standard and Poor's 500 stock index	144.1	**147.4**

Computerworld stock trading index

CLOSING PRICES WEDNESDAY, NOVEMBER 5, 1986

EXCH		52-WEEK RANGE (1)		CLOSE NOV 5 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS					
O	ALPHA MICROSYSTEMS	8	4	5.13	-0.3	-4.7
O	ALTOS COMPUTER SYS	19	10	10.00	-0.4	-3.6
A	AMOAHL CORP	23	11	21.88	+0.1	+0.6
O	APOLLO COMPUTER INC	18	9	12.88	-0.1	-1.0
O	APPLE COMPUTER INC	39	19	37.00	+3.6	+10.9
N	AT&T	26	20	25.50	+1.3	+5.2
N	BURROUGHS CORP	79	57	77.88	+0.1	+0.2
O	C P T CORP	7	3	3.13	-0.3	-7.4
N	COMPAQ COMPUTER CORP	18	10	16.75	+1.4	+8.9
A	COMPUTER CONSOLES INC	12	6	9.50	+0.3	+2.7
O	CONCURRENT COMP CORP	25	1	15.00	+1.5	+11.1
N	CONTROL DATA CORP OEL	29	17	26.50	-0.5	-1.9
O	CONVERGENT TECH	14	4	6.25	+1.6	+35.1
N	CRAY RESH INC	100	57	75.00	+2.1	+2.9
O	OAISY SYS CORP	32	8	8.75	+0.5	+6.1
N	OATA GEN CORP	50	25	30.88	+2.9	+10.3
N	OATAPOINT CORP	9	5	8.38	-0.1	-1.5
N	OIGITAL EQUIP CORP	105	57	103.63	+5.5	+5.6
N	ELECTRONIC ASSOC INC	7	4	4.00	+0.0	+0.0
N	FLOATING POINT SYS INC	46	11	11.75	+0.9	+8.0
N	GOULO INC	34	15	19.25	-0.6	-3.1
N	HARRIS CORP DEL	36	25	30.25	+0.3	+0.8
N	HEWLETT PACKARO CO	50	31	42.00	+2.8	+7.0
N	HONEYWELL INC	87	62	74.00	+2.4	+3.3
N	I8M	162	120	123.13	+2.3	+1.9
O	IPL SYS INC	4	1	2.13	+0.0	+0.0
N	ITT CORP	60	33	54.75	+0.6	+1.2
N	M A COM INC	19	12	12.00	-0.8	-5.9
N	MATSUSHITA ELEC INDL LTD	118	55	107.88	-6.6	-5.8
O	MENTOR GRAPHICS CORP	21	11	17.13	-0.5	-2.8
N	MOHAWK OATA SCI CORP	4	1	2.38	+0.0	+0.0
N	NBI INC	14	8	7.63	-0.6	-7.6
N	NCR CORP	57	35	47.50	+1.5	+3.3
N	PRIME COMPUTER INC	28	16	17.63	+0.6	+3.7
N	SPERRY CORP	77	46	75.75	+0.0	+0.0
O	STRATUS COMPUTER	26	17	20.75	+0.8	+3.8
O	SYM8OLICS INC	16	4	4.25	-0.4	-8.1
O	TANOEM COMPUTERS INC	40	17	38.13	-0.6	-1.6
N	TANDY CORP	45	31	41.25	+2.6	+6.8
N	TEXAS INSTRS INC	148	91	116.63	+6.4	+5.8
A	ULTIMATE CORP	35	13	18.25	+3.6	+24.8
A	WANG LA8S INC - 8	23	11	12.00	+0.3	+2.1
A	WANG LA8S INC - C	23	11	11.88	+0.5	+4.4
N	XEROX CORP	72	49	58.00	+3.0	+5.5
	SUPPLIES & ACCESSORIES					
N	AMER 8USINESS PROOS	37	25	26.25	+0.4	+1.4
N	8ARRY WRIGHT CORP	25	15	15.50	-0.3	-1.6
A	OUPLEX PROOS INC	23	18	19.25	-0.1	-0.6
N	ENNIS 8USINESS FORMS INC	28	19	24.13	+0.8	+3.2
N	3M CO	116	79	109.25	+0.0	+0.0
N	MOORE LTO	28	19	21.50	-0.1	-0.6
O	STANOARO REGISTER CO	50	32	33.50	+1.3	+3.9
N	WALLACE COMPUTER SVCS	50	36	42.00	+2.5	+6.3

EXCH		52-WEEK RANGE (1)		CLOSE NOV 5 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & OP SERVICES					
O	ADVANCED COMP TECH	7	4	5.13	+0.3	+5.1
N	ADVANCED SYS INC	19	12	14.88	+0.8	+5.3
N	AGS COMPUTERS INC	25	16	23.25	+1.5	+6.9
O	AMERICAN MGMT SYS INC	20	10	18.25	+0.5	+2.8
O	AMERICAN SOFTWARE INC	15	9	14.38	-0.1	-0.9
N	ANACOMP INC	7	3	4.25	+0.8	+21.4
O	ANALYSTS INTL CORP	10	4	7.63	+0.6	+8.9
O	ASHTON TATE	43	13	42.13	+5.3	+14.2
O	ASK COMPUTER SYS INC	15	9	13.25	+1.1	+9.3
O	ASTRADYNE COMP IND	3	1	2.41	+0.5	+24.2
N	AUTOMATIC OATA PROC	39	27	36.88	+0.0	+0.0
O	COMPUTER ASSOC INTL INC	25	12	22.75	+0.0	+0.0
O	COMPUTER HORIZONS CORP	15	10	11.50	+1.3	+12.2
O	COMPUTER NETWORK TECH	10	2	5.06	+0.0	+0.0
N	COMPUTER SCIENCES CORP	40	28	37.63	+0.4	+1.0
O	COMPUTER TASK GROUP INC	19	11	13.00	+0.0	+0.0
O	COMPUTONE SYS INC	6	0	0.56	+0.3	+79.9
O	COMSHARE INC	16	10	11.50	+1.0	+9.5
N	CULLINET SOFTWARE INC	20	6	8.63	+0.5	+6.2
O	CYCARE SYS INC	17	9	8.75	+0.0	+0.0
O	OUQUESNE SYS INC	33	14	34.00	+1.0	+3.0
N	GENERAL ELEC CO	83	60	79.00	+2.9	+3.8
N	GENERAL MTRS CORP	50	30	33.00	-2.0	-5.7
N	GTE CORP	63	41	62.38	+2.1	+3.5
O	HOGAN SYS INC	12	6	11.38	-0.3	-2.2
O	INFORMATION SCIENCES INC	4	1	2.00	+0.5	+33.3
O	INFOTRON SYS CORP	19	8	10.50	-1.0	-8.7
O	KEANE INC	16	6	6.00	+0.5	+9.1
N	LOGICON INC	43	24	26.50	+0.4	+1.4
O	LOTUS OEV CORP	52	18	51.25	+1.0	+2.0
O	MANAGEMENT SCI AMER	16	9	13.75	+0.4	+2.8
O	MCI COMM CORP	13	6	7.00	+0.9	+14.3
O	MICOM SYS INC	23	10	12.75	+0.3	+2.0
O	MICRO PRO INTL CORP	4	2	2.00	-0.1	-3.1
O	MICROSOFT CORP	44	26	43.50	+5.0	+13.0
O	NATIONAL OATA CORP	26	15	23.38	-0.3	-1.1
O	ON LINE SOFTWARE INT	16	6	13.63	+3.4	+32.9
O	ORACLE SYS CORP	29	13	19.50	+1.8	+9.9
N	PANSOPHIC SYS INC	36	21	32.00	+1.5	+4.9
N	PLANNING RESH CORP	31	14	31.13	+0.1	+0.4
O	POLICY MGMT SYS CORP	24	15	20.50	+0.8	+3.8
O	PROGRAMMING & SYS INC	11	6	8.38	-0.2	-2.2
O	REYNOLDS & REYNOLOS CO	42	21	31.00	+0.0	+0.0
O	SCIENTIFIC COMPUTERS INC	6	4	5.75	+0.4	+7.0
O	SEI CORP	28	15	19.25	+0.6	+3.4
O	SHAREO MEO SYS CORP	41	29	36.38	+0.3	+0.7
O	SOFTWARE AG SYSTEMS INC	22	14	14.88	-0.1	-0.8
O	SOFTWARE PU8G CORP	10	5	7.38	+1.0	+15.7
A	STERLING SOFTWARE INC	21	9	15.50	+0.4	+2.5
N	UCCEL CORP	26	13	23.88	-1.4	-5.4
N	URS CORP	17	10	16.38	-1.3	-7.1
O	VM SOFTWARE INC	32	17	29.50	-0.3	-0.8
	SEMICONDUCTORS					
N	AOVANCEO MICRO OEV	34	13	16.00	+2.0	+14.3
N	ANALOG OEVICES INC	25	15	17.00	-0.1	-0.7
O	ANALOGIC CORP	16	10	11.13	+0.8	+7.2
N	APPLIED MAGNETICS CORP	20	13	15.00	+0.3	+1.7
O	AVANTEK INC	24	15	16.00	-0.5	-3.0
O	HAOCO CORP	7	3	3.75	-0.3	-6.3
O	INTEL CORP	32	16	21.25	+1.0	+4.9
O	MICRO MASK INC	7	2	3.00	+0.4	+14.3
N	MOTOROLA INC	50	31	38.38	+2.8	+7.7
N	NATIONAL SEMICONDUCTOR	16	8	10.75	+1.5	+16.2
N	TERAOYNE INC	30	16	16.75	+0.4	+2.3

EXCH		52-WEEK RANGE (1)		CLOSE NOV 5 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	PERIPHERALS & SUBSYSTEMS					
A	AM INTL INC	9	5	6.38	+0.3	+4.1
A	ANDERSON JACO8SON INC	3	2	1.88	+0.0	+0.0
O	AST RESH INC	33	11	11.38	-0.3	-2.2
O	AUTOTROL CORP	10	6	6.81	+0.1	+0.9
O	AVANT GAROE COMPUTING	7	3	4.50	+0.0	+0.0
O	BANCTEC INC	13	6	10.50	+0.1	+1.2
N	8OLT BERANEK & NEWMAN	48	30	41.38	-0.1	-0.3
N	CENTRONICS OATA COMP	8	4	7.63	+0.6	+8.9
A	CETEC CORP	9	5	5.63	-0.1	-2.2
A	COGNITRONICS CORP	6	2	2.38	-0.1	-5.0
N	COMPUGRAPHIC CORP	29	16	19.25	+0.3	+1.3
N	COMPUTERVISION CORP	19	10	15.50	+0.5	+3.3
N	CONRAC CORP	18	13	14.13	-0.1	-0.9
A	OATAPROOUCTS CORP	18	13	13.25	-0.3	-1.9
A	OATARAM CORP	18	6	7.50	-0.1	-1.6
O	OATA SWITCH CORP	9	5	6.88	+1.4	+25.0
O	OATUM INC	7	4	4.50	+0.1	+2.9
N	OECISION INOS CORP	15	8	9.88	+0.6	+6.8
O	ENOATA INC	8	3	6.63	+0.4	+6.0
O	EVANS & SUTHERLANO	29	18	27.25	+0.3	+0.9
N	FLOATING POINT SYS INC	46	11	11.75	+0.9	+8.0
O	GANOALF TECHNOLOGIES	8	5	6.63	+0.6	+10.4
N	GENERAL OATACOMM INO	15	8	9.00	+0.3	+2.9
N	HAZELTINE CORP	30	16	29.88	+0.3	+0.8
O	ICOT CORP	13	7	9.75	+1.0	+11.4
O	INFORMATION INTL INC	18	11	13.75	+0.0	+0.0
O	INTECOM INC	7	3	5.31	+0.0	+0.0
O	INTERLEAF INC	15	8	10.63	+0.8	+7.6
O	MEGADATA CORP	5	2	2.38	+0.1	+5.6
A	MSI DATA CORP	14	8	12.88	+0.9	+7.3
N	NASHUA CORP	28	12	22.75	-0.5	-2.2
O	NETWORK SYS CORP	25	10	12.13	+0.3	+2.1
N	NORTH AMERN PHILIPS CORP	48	33	39.25	+0.4	+1.0
N	NORTHERN TELECOM LTD	38	25	32.00	+0.8	+2.4
O	NOVELL INC	26	14	25.00	+1.9	+8.1
O	OMEX	1	0	0.38	+0.0	+0.0
N	PARAOYNE CORP	11	4	4.25	-0.6	-12.8
A	PENRIL CORP	9	5	5.38	-0.4	-6.5
N	PLESSEY PLC	38	19	25.50	+1.6	+6.8
O	PRINTRONIX INC	15	11	12.00	+0.0	+0.0
O	QMS INC	16	8	15.00	+0.5	+3.4
O	RAMTEK CORP	7	3	4.13	-0.3	-5.7
N	RECOGNITION EQUIP INC	17	10	14.50	+0.0	+0.0
N	SANOERS ASSOC INC	63	29	59.88	+0.0	+0.0
O	SCAN TRON CORP	19	10	16.25	+0.0	+0.0
N	SCIENTIFIC ATLANTA INC	15	9	9.75	+0.5	+5.4
O	SEAGATE TECHNOLOGY	19	5	17.38	-0.8	-4.1
N	STORAGE TECHNOLOGY	7	1	2.50	+0.3	+11.1
O	SUN MICROSYSTEM INC	20	11	19.13	+0.3	+1.3
A	T-8AR INC	8	5	7.25	+0.0	+0.0
A	TA8 PROOS CO	15	11	12.50	-0.8	-5.7
O	TANOON CORP	8	2	2.13	+0.1	+6.3
A	TEC INC	8	4	4.06	-0.1	-1.5
N	TEKTRONIX INC	69	50	68.63	+1.6	+2.4
O	TELEVIOEO SYS INC	4	2	2.25	-0.1	-5.3
N	TELEX CORP	69	48	62.75	+0.3	+0.4
N	TIMEPLEX INC	24	14	18.88	+0.6	+3.4
N	TITAN CORP	12	6	7.25	+0.1	+1.8
O	VISUAL TECHNOLOGY INC	1	0	0.59	+0.0	+0.0
O	WYSE TECH	19	10	15.13	-0.3	-1.6
	LEASING COMPANIES					
N	COMOISCO INC	25	12	17.88	+0.5	+2.9
N	CONTINENTAL INFO SYS	12	6	9.00	+0.0	+0.0
O	FINALCO GROUP INC	5	3	2.75	-0.4	-12.0
O	PHOENIX AMERN INC	6	2	4.50	-0.3	-5.3
O	SELECTERM INC	12	5	6.25	+0.5	+8.7
N	U.S. LEASING	46	34	45.13	+0.9	+2.0

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; 8=8OSTON;
L=NATIONAL; M=MIOWEST; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST 8IO
(1) TO NEAREST DOLLAR

COMPUTER INDUSTRY

INSIDE

INSTANT ANALYSIS

"We want to serve your customers and suggest that they can be better served by your not buying one of us in each niche. . . . You owe us better than this."

— Bernard Goldstein, Broadview Associates partner and past president of ADAPSO, calling for IBM to abort its agreement with Hogan Systems, Inc. at ADAPSO's 25th annual meeting

Tax reform spurs buy-outs

Three software vendors acquire smaller firms

By Clinton Wilder and Alan Alper

Spurred by the prospect of increased product offerings and the timetable of tax reform, three leading mainframe software companies announced agreements for major acquisitions of smaller software vendors last week.

In unrelated deals, Management Science America, Inc. (MSA) will acquire manufacturing software firm Comserv Corp. for $27 million; Computer Associates International, Inc. will purchase graphics specialist Integrated Software Systems Corp. (Issco) for $69 million; and Pansophic Systems, Inc. will absorb statistical software developer SPSS, Inc. for $32 million.

While smaller software companies continue to seek deep-pocketed suitors to stay viable, the flurry of acquisition activity appears to be motivated by the impending tax law changes rather than anything else, analysts said last week.

"It has become apparent that the new tax law is driving all this activity," said Chris Mortenson, an analyst with Alex Brown & Sons, Inc. in Baltimore. "In the MSA-Comserv deal particularly, people who are selling their stock would get better capital gains treatment this year vs. next year. MSA can also make better use of the tax loss carryforward this year rather than next."

In addition, all three acquirers stressed the integration of the newly acquired products with their current lines. MSA will be acquiring a financially troubled competitor in the manufacturing market it has targeted as a key growth area, while Computer Associates and Pansophic will each absorb applications packages to complement their systems software products.

MSA-Comserv Eagan, Minn.-based Comserv will be combined with the MSA division that sells all MSA products to manufacturing firms. MSA Executive Vice-President Dennis Vohs was named president of the Atlanta-based MSA subsidiary,

See **TAX** page 124

Hayes seeks modem royalties

By James A. Martin

NORCROSS, Ga. — Hayes Microcomputer Products, Inc. has developed a controversial licensing policy aimed at extracting royalties from Hayes-compatible modem manufacturers.

The licensing policy varies with each manufacturer, but in general asks for a 2% royalty fee on the net selling price for each compatible modem sold, according to a Hayes spokeswoman.

As a result, Hayes could stand to gain — and other modem vendors collectively could lose — as much as $3 million or $4 million a year in additional revenue, observers said.

The policy was developed after Hayes received a patent in October 1985 for its modems that feature improved escape sequence with guard time. The escape sequence allows a modem to escape, or change, from receiving or transmitting data to the IBM Personal Computer AT command set mode. Most, but not all, modems that claim to be Hayes-compatible feature this technology.

Protecting R&D

Hayes President Dennis C. Hayes said the policy was developed to protect Hayes's research and development efforts. "As new products and processes are developed to provide the capabilities that end users will require, protection for our intellectual property will remain a high priority," he said.

Although most vendors contacted last week said they have not had a chance to review the licensing agreement, some speculated that there could be a storm brewing.

"It is unlikely that major modem companies would sign up for such a license," according to Kim Maxwell, president of Ra-

See **HAYES** page 124

INDUSTRY INSIGHT
Clinton Wilder

The explosive income fund

As it enters the world after investment tax credits, is the computer leasing industry facing a potential time bomb?

The use of so-called income funds as a financing mechanism for lease deals is a complicated issue on which leasing company executives are deeply divided. But the potential for income fund abuse could explode in the face of an industry that has struggled for, and gained, respectability.

The Computer Dealers and Lessors Association (CDLA), at its recent annual meeting in snowy Colorado Springs, held a closed-door, members-only session on the topic of income funds. Not surprisingly, there was no consensus, and the CDLA will not take an official position, at least not yet. But according to newly elected association President Robert Gulko, "If we see obvious abuses, we are going to look into them."

Essentially, an income fund gives the lessor financing to purchase his leasing inventory. Instead of selling individual lease deals directly to investors who could take advantage of the related tax benefits, the fund can pool investments from various sources — single investors, pension funds, individual retirement accounts — many of which may not be familiar with the complexities of the leasing business.

In return for putting up principal, the investor earns an interest rate based in large part on what the lessor believes the price of the used computer will be when the lease expires. That

See **EXPLOSIVE** page 102

Wilder is Computerworld's *senior editor, computer industry.*

Chip merger concerns U.S.

By James A. Martin

The proposed alliance between American chip vendor Fairchild Semiconductor Corp. and Japanese manufacturer Fujitsu Ltd. is stirring some major concerns for the future of the U.S. semiconductor, hardware and software industries.

Silicon Valley's semiconductor industry is not taking the announcement lightly. Several U.S. vendors, including Intel Corp., have reportedly held a Semiconductor Industry Association (SIA)-sponsored meeting to discuss the merger and its implications. An SIA spokesman, however, refuses to comment or acknowledge that such a meeting has taken place.

The Reagan administration is said to be considering a challenge on national security grounds to the previously announced Fairchild-Fujitsu merger, in which Fujitsu would acquire 80% control of Fairchild [CW, Nov. 3]. Because Fairchild is a major vendor of bipolar gate-array technology used in highly classified high-speed weapons and military equipment, the U.S. should protect its technology from falling into foreign control, officials say.

But some analysts say the government should be more worried that Japan could make strong inroads into the U.S. chip industry through additional, similar mergers.

"Chips are extremely important to the technology world, and whoever controls semiconductor technology will probably, eventually, control the hardware side of the computer business and, as a result, the software side as well," says Paul Johnson, an

See **CHIP** page 124

Judge discloses stock ownership; NEC seeks ouster from lawsuit

By James A. Martin

SAN JOSE, Calif. — The disclosure by the presiding federal judge that he owns a small amount of Intel Corp. stock could prove to be an important technicality in the future of the landmark semiconductor lawsuit between Intel and NEC Electronics, Inc.

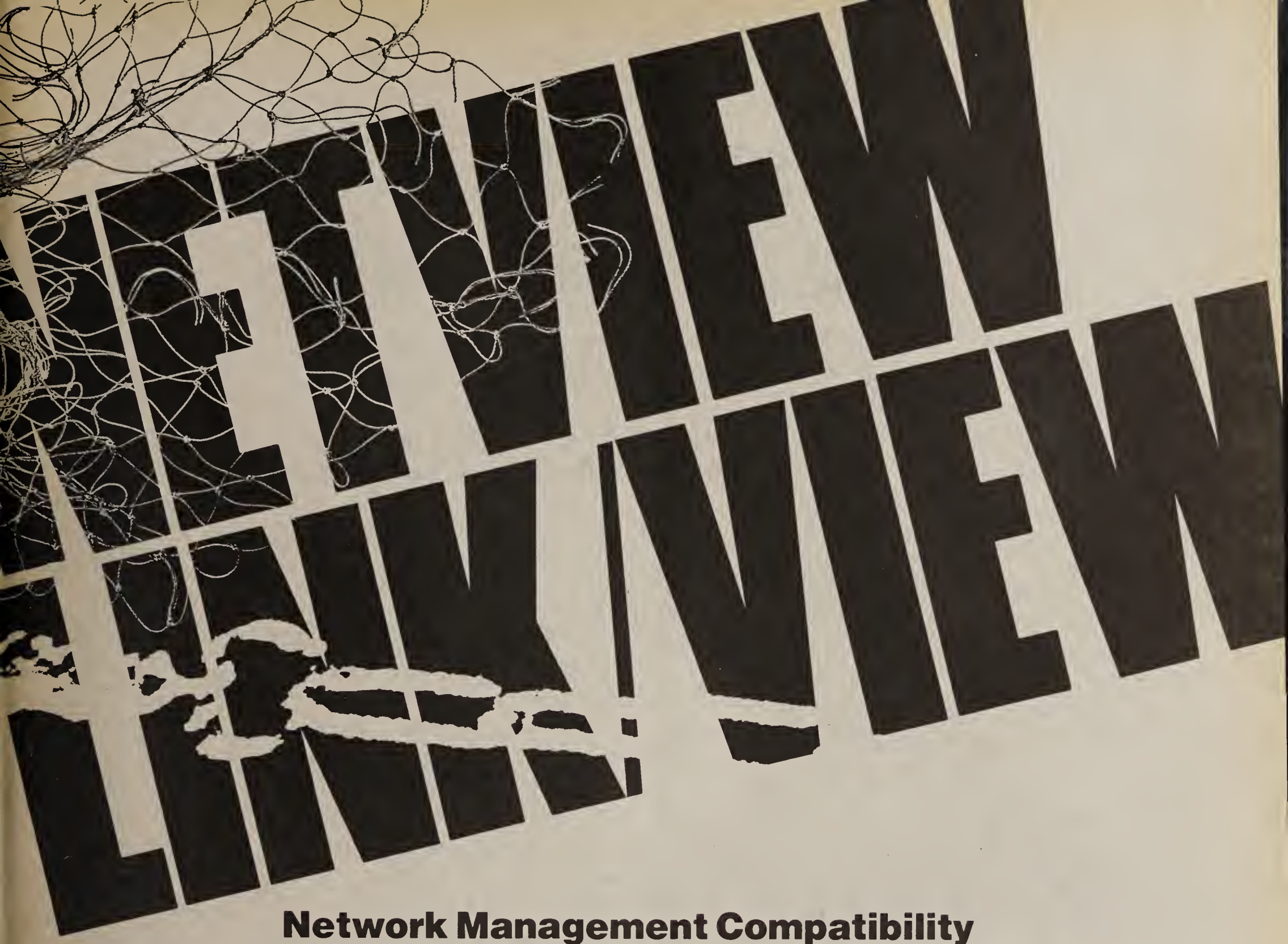
Last week, NEC filed a motion to disqualify U.S. District Court Judge William A. Ingram from continuing to preside over future Intel-NEC litigation after NEC attorneys learned Ingram indirectly owned approximately $80 of Intel common stock through his participation in an investment club.

Ingram's September ruling in the Intel-NEC case that microcode was copyright protected was hailed as an industry milestone [CW, Sept. 29]. Still to be decided in the case is whether or not NEC violated Intel copyrights.

The disclosure of Ingram's financial interest in Intel is "an important technicality," according to Michael Gumport, a semiconductor analyst with Drexel Burnham Lambert, Inc. in New York. "It's hard to believe that $80 is an amount that could decide the issue in the judge's mind, then push him one way or the other. But it might be enough to cause a retrial or mistrial."

NEC filed suit in December 1984 seeking a judgment that microcode was not protected under U.S. copy-

See **JUDGE** page 107



Network Management Compatibility Brings Timeplex T-1 Product Diagnostics Support To IBM SNA Environment

Now from Timeplex–LINK/VIEW–a network management interface to IBM's new NetView network management system providing an unprecedented, single-site "view" of your entire T-1 network. LINK/VIEW enables Timeplex LINK/1 and LINK/2 T-1 Resource Managers to be diagnostically integrated into an IBM SNA network control center operating under NetView.

LINK/VIEW is the first in a series of network management interfaces that will ultimately extend end-to-end management of non-SNA Timeplex networking devices into the SNA environment. LINK/VIEW provides alarm reporting and network status displays of LINK Family products–LINK/1 T-1 Facilities Management System, LINK/2 Data/Voice Network Exchange, the miniLINK/1 and miniLINK/2 systems.

A Timeplex-developed software package, LINK/VIEW runs on the IBM NetView/PC network control processor system.

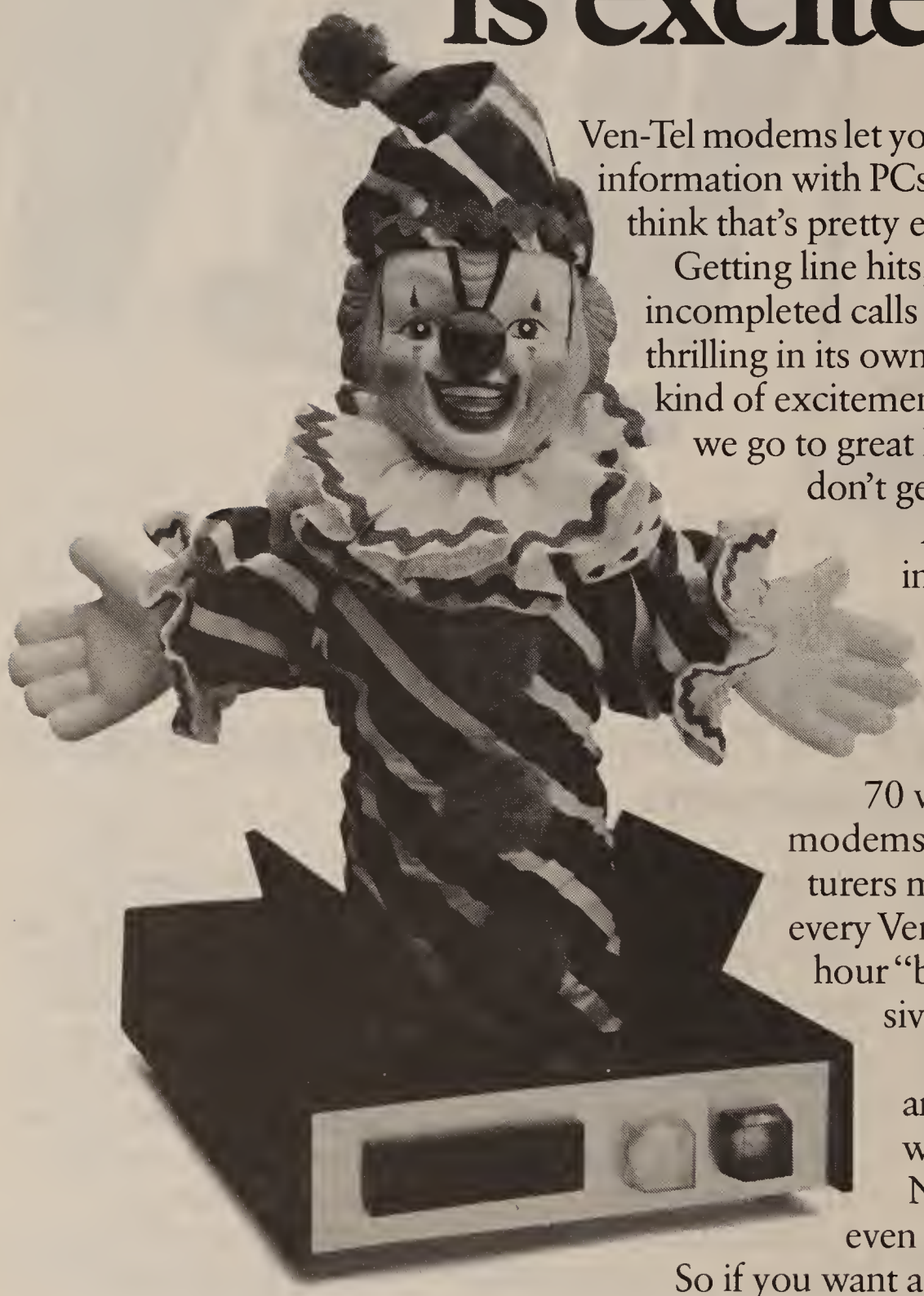
The introduction of NetView-compatible interfaces recognizes the importance of centralized alarm reporting diagnostics of all components of an integrated network. At Timeplex, the need for single-site network management and diagnostics is essential... we've always held that view.

LINK/VIEW...just one of the network management systems available from Timeplex. Why not see for yourself?

Timeplex®

Timeplex, Inc., Woodcliff Lake, NJ 07675, 201-930-4600

The last thing you want from your modem is excitement.



Ven-Tel modems let you use your phone to exchange information with PCs anywhere in the world. We think that's pretty exciting.

Getting line hits, dropped connections and incompleted calls from your modem can be thrilling in its own way, too. But that's not the kind of excitement you need in business. And we go to great lengths to make sure you don't get it.

At Ven-Tel we've been making more reliable modems since 1974.

Ven-Tel modems put less stress on your PC because they have fewer components—70 vs. the 300 or so in other modems. And while other manufacturers may settle for random testing, every Ven-Tel modem must pass a 72 hour "burn-in" period—plus extensive testing on real phone lines.

As good as Ven-Tel modems are, we still back every one with a free *five-year* warranty. No other major manufacturer even comes close.

So if you want a modem that won't add the wrong kind of excitement to your workday, you want Ven-Tel.

Ven-Tel
Modems

Our free 24-page booklet, "How To Select The Correct Modem," contains specific information about our full line of modems. To request your copy, call 800-538-5121. In California, call 408-727-5721.